NASA Student Launch

2013-2014 Safety Manual

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SECTION 1: INTRODUCTION

1.1) PURPOSE

The purpose of the safety manual is to clearly identify all rules and regulations that the team must follow. It is the safety officer's responsibility to ensure the overall good health and safety of the team, students, and all other personnel as well as compliance with all laws and regulations. This document is the means for the safety officer to effectively communicate the requirements to the team as well as provide all safety information necessary.

1.2) REVISION HISTORY

Revision	Reason For Change	Reviser	Effectively Date
__	__	Emily	1/10/2014
A	Update educational safety and MSDS.	Emily	2/25/2014

SECTION 2: LAB WORKSHOP SAFETY

2.1) PURPOSE

Maintaining a safe work environment is essential for the team. This is a means of protecting all personnel from harm as well as the rocket and any equipment from damage. The following details general safety guidelines that are set forth by the team as well as lab specific

2.2) GENERAL LAB RULES

Work Restrictions
No person is authorized to work alone in a lab or workshop at any times. At least two personnel are required to be working in an area at a time. In the case that there is an emergency, a lab partner should be able to assist.

Attire
All personnel shall wear appropriate clothing at all times while in the lab:

- No loose clothing or jewelry that could get caught in moving machinery shall be worn.
- Long hair should be tied back in order to avoid getting caught in any moving machinery.
- Jewelry or other metal objects should not be worn while working with energized electrical circuits.
- Closed toed shoes are to be worn at all times.
- Long sleeves are to be worn when working with fiberglass.

Tool Training
Individuals must be trained on any tools used. Those not trained should not attempt to learn on their own. An unexperienced person should take the following two steps in being trained on a new tool:

1. The user should thoroughly read the user manual, making sure they completely understand the document.
2. The trainee should seek out a mentor, who has been recently trained or experience on the particular piece of equipment.

Workspace
All workspaces should be kept neat and orderly. A clean as you go mentality should be used in order to prevent a cluttered workspace. After completing a task in an area, the

workspace should be cleaned. Any dust or metal shavings shall be vacuumed and all tools and parts should be accounted for and put away. By using Foreign Object Elimination (FOE) techniques, Foreign Object Debris (FOD) can be avoided. FOD can be particularly dangerous in the electrical components that are Foreign Object Sensitive (FOS), causing shorts, failures, or the charging of undesired components.

All cabling shall be routed in such a way that it is not a trip hazard. This should also be kept in mind during launch day preparations and while in the workshop. With limited space, it is important to keep the floor space clear to prevent anyone from tripping and harming themselves or risking damaging any component of the rocket.

2.3) PERSONAL PROTECTION EQUIPMENT (PPE)

Hazardous Tasks
All lab user shall assess any hazardous tasks and take the proper precautions. Material Safety Data Sheets (MSDS) and operator manuals shall be consulted as necessary. Appropriate Personal Protective Equipment (PPE) should be worn in the lab, especially when performing hazardous tasks.

Safety Glasses
Safety glasses shall be worn at all times in the any lab, especially when performing tasks where flying foreign debris or splashed chemicals could get in ones face. Safety glasses will be available to all team members. Children are to wear safety glasses during educational event activities where foreign debris or objects could damage the student's eye.

Hearing Protection
Hearing protection should be worn when working with power tools and during any other loud operations as required.

Protective Gloves
Different types of gloves shall be worn in order to protect hands during various operations:

- Cut resistant gloves should be worn when working with cutting instruments to mitigate the risks of severe cuts from tooling.
- Nitrile gloves should be worn while working with hazardous materials.
- Thermal gloves should be worn while working with heat elements or heated components.

Face Masks
Different types of masks shall be worn during various tasks to mitigate various safety hazards. MSDS should be consulted to determine if the use of a mask is necessary.

- Dust masks shall be worn when working with materials such as plywood that generate dust particles, particularly while sanding.
- When working with chemicals producing toxic fumes, a vapor mask should be worn. The MSDS should be consulted prior to working with any chemicals to see if a vapor mask is necessary. It is important to make sure that the vapor mask provides the appropriate filtration for the chemical used.
- A full face shield should be worn when performing any operation that produces sparks.

2.4) TOOL SPECIFIC SAFETY

It is important to be familiar with any tool specific safety informations for personal safety and to ensure that the rocket does not suffer damage from improper use of tools. It is particularly important to know these guidelines in order to keep the equipment in top condition. Much of the equipment used in the lab is not personally owned by the team, so it is important to take particularly good care of it.

Full Spectrum Laser
The full spectrum laser is located at LVL 1. The following are the safety rules and regulations for the laser set forth by the workshop.

- Read the instruction manual first.
- Speak to someone who is experienced with the laser cutter prior to use so that you can be shown where everything is, how to set up the software, how to use it without breaking it, basic safety tips, etc.
- Always make sure the water pump and air assist are running before operating the laser. A failure of the water pump will destroy the laser.
- Never operate the laser cutter unattended in case of a fire. A CO_2 fire extinguisher is kept next to the laser to put out small fires. Again, NEVER step away while the laser cutter is operating. You must be nearby and undistracted in order to stop the laser cutter in the event of an emergency.
- Only use the E-stop in case of an emergency. Usually this means things are on fire. To stop the laser in the case of material positioning or other non-emergency, cancel the job in the Retina Engrave software. If the E-stop has been implemented, stop all laser jobs and turn off the laser before unsetting the E-stop. Failure to do this will fry the electronics.

- Never turn the current up above 15 milliamps, as indicated on the analog meter. Exceeding 15 mA will destroy the laser tube quickly. The multi-turn potentiometer should rarely, if ever, be adjusted. Power percentages below 100% of the 15 mA can be adjusted in the Retina Engrave software.
- If little flames shoot up off of your material, turn down the power. Little flames can start fires and will fog up the lens, which is difficult to clean. Flames will also melt the laser's plastic rollers and cause problems traversing the X-axis until they are replaced.
- It is easy to make the laser head bang against the side or top of the unit. This causes an awful noise and is very bad for the gears. If the laser cutter makes a banging noise, stop it immediately and reposition the laser head before the next cut, or resize the artwork.
- Do not cut plastics that create hazardous fumes when burned. Acrylic is okay. PVC and vinyl release the very toxic gas phosgene when heated. As a general rule, chemical resistant plastics should not be put in the laser cuter. If you are not 00% certain your material is safe, you must verify it first.
- Be very careful with the silver honeycomb, especially when removing it from the machine to clean little bits of debris off of it. It bends very easily and once bent cannot be straightened out completely. It is mostly a cosmetic issue, but pressing your thumb in the wrong place will cause permanent marks.
- Do not laser materials that make an excessive amount of smoke. A little smoke is okay, but a large amount can fog up the lens. If it is making a lot of smoke, use more passes at a lower power.
- When cutting paper, turn down the power to a couple milliamps, or it will catch fire.

MakerBot Replicator 2 Desktop 3D Printer

There are two MakerBot Replicator 3D Printers located at LVL1. The following are the safety rules and regulations for the laser set forth by the workshop.

- The MakerBot Replicator 2 Desktop 3D Printer includes moving parts that can cause injury and generates temperatures in the region of 230° C. Never reach inside the MakerBot Replicator 2 while it is in operation and do not touch the extruder while it is heating. Always allow the MakerBot Replicator 2 to cool down before reaching inside.
- Contact with extruded material may cause burns. Wait for printed objects to cool before removing them from the build plate.
- When opening the MakerBot Replicator 2 for service, ensure that the power supply is turned off and the cord is disconnected.
- Do not leave the MakerBot Replicator 2 unattended during operation.

SECTION 3: LAWS AND NAR/TRA REGULATIONS

3.1) NAR: HIGH POWER ROCKET SAFETY CODE

The below table describes each component of the NAR High Power Rocket Safety Code, effective August 2012, and how the team will comply with each component. Additionally, the minimum distance table has been included below.

NAR Code	Compliance
1. **Certification.** I will only fly high power rockets or possess high power rocket motors that are within the scope of my user certification and required licensing.	Only Darryl Hankes, Gregg, and Zak are permitted to handle the rocket motors. If during the season, an additional team member achieves the required certification, he/she will be approved to handle the motors after that date.
2. **Materials.** I will use only lightweight materials such as paper, wood, rubber, plastic, fiberglass, or when necessary ductile metal, for the construction of my rocket.	The Mechanical Engineering team will be responsible for selecting the appropriate materials for construction of the rocket.
3. **Motors.** I will use only certified, commercially made rocket motors, and will not tamper with these motors or use them for any purposes except those recommended by the manufacturer. I will not allow smoking, open flames, nor heat sources within 25 feet of these motors.	Motors will be purchased through Wildman Rocketry and will only be handled by certified members of the team who are responsible for understanding how to properly store and handle the motors.
4. **Ignition System**. I will launch my rockets with an electrical launch system, and with electrical motor igniters that are installed in the motor only after my rocket is at the launch pad or in a designated prepping area. My launch system will have a safety interlock that is in series with the launch switch that is not installed until my rocket is ready for launch, and will use a launch switch that returns to the "off" position when released. The function of onboard energetics and firing circuits will be inhibited except when my rocket is in the launching position.	All launches will be at NAR/TRA certified events. The Range Safety Officer will have the final say over any safety issues.

5. **Misfires.** If my rocket does not launch when I press the button of my electrical launch system, I will remove the launcher's safety interlock or disconnect its batter and will wait 60 seconds after the last launch attempt before allowing anyone to approach the rocket.	The team will comply with this rule and any additional precautions that the Range Safety Officer makes on launch day.
6. **Launch Safety.** I will use a 5-second countdown before launch. I will ensure that a means is available to warn participants and spectators in the event of a problem. I will ensure that no person is closer to the launch pad than allowed by the accompanying Minimum Distance Table. When arming onboard energetics and firing circuits I will ensure that no person is at the pad except safety personnel and those required for arming and disarming operations. I will check the stability of my rocket before flight and will not fly it if it cannot be determined to be stable. When conducting a simultaneous launch of more than one high power rocket I will observe the additional requirements of NFPA 1127.	The team will comply with this rule and any determination the Range Safety Officer makes on launch day.
7. **Launcher.** I will launch my rocket from a stable device that provides rigid guidance until the rocket has attained a speed that ensures a stable flight, and that is pointed to within 20 degrees of vertical. If the wind speed exceeds 5 miles per hour I will use a launcher length that permits the rocket to attain a safe velocity before separation from the launcher. I will use a blast deflector to prevent the motor's exhaust from hitting the ground. I will ensure that dry grass is cleared around each launch pad in accordance with the accompanying Minimum Distance table, and will increase this distance by a factor of 1.5 and clear that area of all combustible material if the rocket motor being launched uses	The team will ensure that the launch pad meets these requirements, using any additional tools necessary on launch day to ensure compliance and a safe launch.

titanium sponge in the propellant.	
8. **Flight Safety**. I will not launch my rocket at targets, into clouds, near airplanes, nor on trajectories that take it directly over the heads of spectators or beyond the boundaries of the launch site, and will not put any flammable or explosive payload in my rocket. I will not launch my rockets if wind speeds exceed 20 miles per hour. I will comply with Federal Aviation Administration airspace regulations when flying, and will ensure that my rocket will not exceed any applicable altitude limit in effect at that launch site.	The team will comply with this rule and any determination the Range Safety Officer makes on launch day.
9. **Launch Site.** I will launch my rocket outdoors, in an open area where trees, power lines, occupied buildings, and persons not involved in the launch do not present a hazard and that is at least as large on its smallest dimension as one-half of the maximum altitude to which rockets are allowed to be flown at that site or 1500 feet, whichever is greater, or 1000 feet for rockets with a combined total impulse of less than 160 N-sec, a total liftoff weight of less than 1500 grams and a maximum expected altitude of less than 610 meters (2000 feet).	All team launches will be at NAR/TRA certified events. The Range Safety Officer will have the final say over any rocketry safety issues.
10. **Launcher Location.** My launcher will be 1500 feet from any occupied building or from any public highway on which traffic flow exceeds 10 vehicles per hour, not including traffic flow related to the launch. It will also be no closer than the appropriate Minimum Personnel Distance from the accompanying table from any boundary of the launch site.	The team will comply with this rule and any determination the Range safety Officer makes on launch day.
11. **Recovery System.** I will use a recovery system such as a parachute in my rocket so that all parts of my rocket return safely and undamaged and can be	The Recovery team will be responsible for designing and constructing a safe recovery system for the rocket. A safety checklist will be used on launch day to

flown again, and I will use only flame-resistant or fireproof recovery system wadding in my rocket.	ensure that all critical steps in preparing and packing the recovery system and all necessary components into the rocket are completed.
12. **Recovery Safety.** I will not attempt to recover my rocket from power lines, tall trees, or other dangerous places, fly it under conditions where it is likely to recover in spectator areas or outside the launch site, nor attempt to catch it as it approaches the ground.	The team will comply with this rule and any determination the Range Safety Officer makes on launch day.

MINIMUM DISTANCE TABLE

Installed Total Impulse (Newton-Seconds)	Equivalent High Power Motor Type	Minimum Diameter of Cleared Area (ft.)	Minimum Personnel Distance (ft.)	Minimum Personnel Distance (Complex Rocket) (ft.)
0 -- 320.00	H or smaller	50	100	200
320.01 -- 640.00	I	50	100	200
640.01 -- 1,280.00	J	50	100	200
1,280.01 -- 2,560.00	K	75	200	300
2,560.01 -- 5,120.00	L	100	300	500
5,120.01 -- 10,240.00	M	125	500	1000
10,240.01 -- 20,480.00	N	125	1000	1500
20,480.01 -- 40,960.00	O	125	1500	2000

Note: A complex rocket is one that is multi-staged or that is propelled by two or more rocket motors

3.2) LOCAL, STATE AND FEDERAL LAW COMPLIANCE

Everyone is required to review and acknowledge regulations regarding unmanned rocket launches and motor handling. Federal Aviation Regulations 14 CFR, Subchapter F, Part

101, Subpart C, Code of Federal Regulation 27 Part 55: Commerce in Explosives; and fire prevention has been included below. Federal Explosives Las and Regulations can be found at the following link: http://www.atf.gov/files/publications/download/p/atf-p-5400-7.pdf. Due to the extent of the regulation, it has be omitted from the document.

Federal Aviation Regulations 14 CFR, Subchapter F, Part 101, Subpart C

Title 14: Aeronautics and Space

CHAPTER I: FEDERAL AVIATION ADMINISTRATION, DEPARTMENT OF TRANSPORTATION (CONTINUED)

SUBCHAPTER F: AIR TRAFFIC AND GENERAL OPERATING RULES

PART 101: MOORED BALLOONS, KITES, AMATEUR ROCKETS AND UNMANNED FREE BALLOONS

Subpart C: Amateur Rockets

101.21 - Applicability.

(a) This subpart applies to operating unmanned rockets. However, a person operating an unmanned rocket within a restricted area must comply with ? 101.25(b)(7)(ii) and with any additional limitations imposed by the using or controlling agency.

(b) A person operating an unmanned rocket other than an amateur rocket as defined in ? 1.1 of this chapter must comply with 14 CFR Chapter III.

[Doc. No. FAA-2007-27390, 73 FR 73781, Dec. 4, 2008]

101.22 - Definitions.

The following definitions apply to this subpart:

(a) Class 1?Model Rocket means an amateur rocket that:

(1) Uses no more than 125 grams (4.4 ounces) of propellant;

(2) Uses a slow-burning propellant;

(3) Is made of paper, wood, or breakable plastic;

Federal Aviation Regulations 14 CFR, Subchapter F, Part 101, Subpart C

Title 14: Aeronautics and Space

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SECTION 4: LAUNCH SAFETY

4.1) LAUNCH DAY BRIEFING

Prior to each launch, a briefing, which each member will be required to attend, will be held to review potential hazards and accident avoidance strategies. In order to prevent an accident, a thorough safety checklist will be created prior to launch day. Throughout preparations, it will be the responsibility of the safety officer to confirm that each of the necessary tasks for a successful launch are completed. This will be verified by having two team members sign off on each step as they completed it, holding them accountable for that portion of the assembly.

4.2) MOTOR SAFETY

Darryl Hankes, the team mentor, who has obtained his Level 3 TRA certification, will be responsible for acquiring, storing, and handling the teams rocket motors at all times. Team members Gregg and Zak, whom are Level 2 certified, are also permitted to assist in this responsibility. If at any time, another member of the team acquires the appropriate certification, they will be added to the list of people permitted to handle the team's motors. By having obtained at minimum a Level 2 certification, the individual has demonstrated that he or she understands the safety guidelines regarding motors. Any certified member of the team that handles or stores the team's motors is responsible for following the appropriate measures. The motors for both test and competition launches will be transported by car to the launch site.

SECTION 5: EDUCATIONAL ENGAGEMENT SAFETY

General

- Children should never work unsupervised.
- A child is never to handle any size rocket motor on their own.
- Safety should always be encouraged when teaching young students about rockets and during construction.
- Personal Protective Equipment that a child, or any other participant in an educational event may need will be provided.

Rocket Construction

- Horseplay in the classroom is not to be tolerated.
- Students are not permitted to use exacto knives during builds. These operations must be performed by an adult.
- Students are not to use the hot glue guns without approval from their parent or teacher and must be informed on how to safely use a hot glue gun.
- Children must work supervised in order to ensure proper assembly of a safe rocket to launch.

Rocket Launch

- Prior to any launch, students are to be briefed on safety procedures. Any students not following these measures will not be able to participate in the remaining launches for the day.
- Students and educators standing near the launch pad are to be wearing safety glasses at all times.
- The secondary key for the launch mechanism must be removed when loading rockets onto the launch pad.
- Students must remain a designated safe distance from the launch pad at all times.
- The secondary key is not to be inserted until all launch pads are clear and the safety officer has given the okay.
- Students are not to launch until they have been given permission by the safety officer. Notification to observing students and a countdown will occur to signify this event.
- Should a rocket not launch on the first attempt, students and educators shall wait 30 seconds to ensure that it was a misfire. The secondary key shall be removed before approaching the launch pad to avoid and accidental launch.
- Students are never to catch a falling rocket or component of a rocket.

SECTION 6: MSDS

6.1) PURPOSE

Material Safety Data Sheets (MSDS) shall be consulted prior to working with any material, making the user aware of any risks in using the material and any safety precautions that should be followed. It is each individual's responsibility to analyze each potential hazard and take the appropriate safety provisions. If any person does not understand any portion of the safety sheet, they should consult the Safety Officer before proceeding with any operations with the material.

6.2) MATERIAL SAFETY DATA SHEETS

Acetone

ScienceLab.com
Chemicals & Laboratory Equipment

Health	2
Fire	3
Reactivity	0
Personal Protection	H

Material Safety Data Sheet
Acetone MSDS

Section 1: Chemical Product and Company Identification

Product Name: Acetone

Catalog Codes: SLA3502, SLA1645, SLA3151, SLA3808

CAS#: 67-64-1

RTECS: AL3150000

TSCA: TSCA 8(b) inventory: Acetone

CI#: Not applicable.

Synonym: 2-propanone; Dimethyl Ketone; Dimethylformaldehyde; Pyroacetic Acid

Chemical Name: Acetone

Chemical Formula: C3-H6-O

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call: 1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Acetone	67-64-1	100

Toxicological Data on Ingredients: Acetone: ORAL (LD50): Acute: 5800 mg/kg [Rat]. 3000 mg/kg [Mouse]. 5340 mg/kg [Rabbit]. VAPOR (LC50): Acute: 50100 mg/m 8 hours [Rat]. 44000 mg/m 4 hours [Mouse].

Section 3: Hazards Identification

Potential Acute Health Effects:
Hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation. Slightly hazardous in case of skin contact (permeator).

Potential Chronic Health Effects:
CARCINOGENIC EFFECTS: A4 (Not classifiable for human or animal.) by ACGIH. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Classified Reproductive system/toxin/female, Reproductive system/toxin/male [SUSPECTED]. The substance is toxic to central nervous system (CNS). The substance may be toxic to kidneys, the reproductive system, liver, skin. Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

p. 1

Eye Contact:
Check for and remove any contact lenses. Immediately flush eyes with running water for at least 15 minutes, keeping eyelids open. Cold water may be used. Get medical attention.

Skin Contact:
In case of contact, immediately flush skin with plenty of water. Cover the irritated skin with an emollient. Remove contaminated clothing and shoes. Cold water may be used.Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.

Serious Skin Contact:
Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek medical attention.

Inhalation:
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention if symptoms appear.

Serious Inhalation:
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

Ingestion:
Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention if symptoms appear.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Flammable.

Auto-Ignition Temperature: 465°C (869°F)

Flash Points: CLOSED CUP: -20°C (-4°F). OPEN CUP: -9°C (15.8°F) (Cleveland).

Flammable Limits: LOWER: 2.6% UPPER: 12.8%

Products of Combustion: These products are carbon oxides (CO, CO2).

Fire Hazards in Presence of Various Substances: Highly flammable in presence of open flames and sparks, of heat.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available. Slightly explosive in presence of open flames and sparks, of oxidizing materials, of acids.

Fire Fighting Media and Instructions:
Flammable liquid, soluble or dispersed in water. SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use alcohol foam, water spray or fog.

Special Remarks on Fire Hazards: Vapor may travel considerable distance to source of ignition and flash back.

Special Remarks on Explosion Hazards:
Forms explosive mixtures with hydrogen peroxide, acetic acid, nitric acid, nitric acid + sulfuric acid, chromic anydride, chromyl chloride, nitrosyl chloride, hexachloromelamine, nitrosyl perchlorate, nitryl perchlorate, permonosulfuric acid, thiodiglycol + hydrogen peroxide, potassium ter-butoxide, sulfur dichloride, 1-methyl-1,3-butadiene, bromoform, carbon, air, chloroform, thitriazylperchlorate.

Section 6: Accidental Release Measures

Small Spill:
Dilute with water and mop up, or absorb with an inert dry material and place in an appropriate waste disposal container.

Large Spill:
Flammable liquid. Keep away from heat. Keep away from sources of ignition. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not touch spilled material. Prevent entry into sewers, basements or confined areas; dike if needed. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Keep locked up.. Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapor/spray. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents, reducing agents, acids, alkalis.

Storage:
Store in a segregated and approved area (flammables area) . Keep container in a cool, well-ventilated area. Keep container tightly closed and sealed until ready for use. Keep away from direct sunlight and heat and avoid all possible sources of ignition (spark or flame).

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection:
Splash goggles. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:
TWA: 500 STEL: 750 (ppm) from ACGIH (TLV) [United States] TWA: 750 STEL: 1000 (ppm) from OSHA (PEL) [United States] TWA: 500 STEL: 1000 [Austalia] TWA: 1185 STEL: 2375 (mg/m3) [Australia] TWA: 750 STEL: 1500 (ppm) [United Kingdom (UK)] TWA: 1810 STEL: 3620 (mg/m3) [United Kingdom (UK)] TWA: 1800 STEL: 2400 from OSHA (PEL) [United States]Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor: Fruity. Mint-like. Fragrant. Ethereal

Taste: Pungent, Sweetish

Molecular Weight: 58.08 g/mole

Color: Colorless. Clear

pH (1% soln/water): Not available.

Boiling Point: 56.2°C (133.2°F)

Melting Point: -95.35 (-139.6°F)

Critical Temperature: 235°C (455°F)

Specific Gravity: 0.79 (Water = 1)

Vapor Pressure: 24 kPa (@ 20°C)

Vapor Density: 2 (Air = 1)

Volatility: Not available.

Odor Threshold: 62 ppm

Water/Oil Dist. Coeff.: The product is more soluble in water; log(oil/water) = -0.2

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water.

Solubility: Easily soluble in cold water, hot water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Excess heat, ignition sources, exposure to moisture, air, or water, incompatible materials.

Incompatibility with various substances: Reactive with oxidizing agents, reducing agents, acids, alkalis.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity: Not available.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Dermal contact. Eye contact. Inhalation.

Toxicity to Animals:
WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE. Acute oral toxicity (LD50): 3000 mg/kg [Mouse]. Acute toxicity of the vapor (LC50): 44000 mg/m3 4 hours [Mouse].

Chronic Effects on Humans:
CARCINOGENIC EFFECTS: A4 (Not classifiable for human or animal.) by ACGIH. DEVELOPMENTAL TOXICITY: Classified Reproductive system/toxin/female, Reproductive system/toxin/male [SUSPECTED]. Causes damage to the following organs: central nervous system (CNS). May cause damage to the following organs: kidneys, the reproductive system, liver, skin.

Other Toxic Effects on Humans:
Hazardous in case of skin contact (irritant), of ingestion, of inhalation. Slightly hazardous in case of skin contact (permeator).

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans:
May affect genetic material (mutagenicity) based on studies with yeast (S. cerevisiae), bacteria, and hamster fibroblast cells. May cause reproductive effects (fertility) based upon animal studies. May contain trace amounts of benzene and formaldehyde which may cancer and birth defects. Human: passes the placental barrier.

Special Remarks on other Toxic Effects on Humans:
Acute Potential Health Effects: Skin: May cause skin irritation. May be harmful if absorbed through the skin. Eyes: Causes eye irritation, characterized by a burning sensation, redness, tearing, inflammation, and possible corneal injury. Inhalation: Inhalation at high concentrations affects the sense organs, brain and causes respiratory tract irritation. It also may affect the Central Nervous System (behavior) characterized by dizzness, drowsiness, confusion, headache, muscle weakeness, and possibly motor incoordination, speech abnormalities, narcotic effects and coma. Inhalation may also affect the gastrointestinal tract (nausea, vomiting). Ingestion: May cause irritation of the digestive (gastrointestinal) tract (nausea, vomiting). It may also

affect the Central Nevous System (behavior), characterized by depression, fatigue, excitement, stupor, coma, headache, altered sleep time, ataxia, tremors as well at the blood, liver, and urinary system (kidney, bladder, ureter) and endocrine system. May also have musculoskeletal effects. Chronic Potential Health Effects: Skin: May cause dermatitis. Eyes: Eye irritation.

Section 12: Ecological Information

Ecotoxicity:
Ecotoxicity in water (LC50): 5540 mg/l 96 hours [Trout]. 8300 mg/l 96 hours [Bluegill]. 7500 mg/l 96 hours [Fatthead Minnow]. 0.1 ppm any hours [Water flea].

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The product itself and its products of degradation are not toxic.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:
Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: CLASS 3: Flammable liquid.

Identification: : Acetone UNNA: 1090 PG: II

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:
California prop. 65: This product contains the following ingredients for which the State of California has found to cause reproductive harm (male) which would require a warning under the statute: Benzene California prop. 65: This product contains the following ingredients for which the State of California has found to cause birth defects which would require a warning under the statute: Benzene California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer which would require a warning under the statute: Benzene, Formaldehyde Connecticut hazardous material survey.: Acetone Illinois toxic substances disclosure to employee act: Acetone Illinois chemical safety act: Acetone New York release reporting list: Acetone Rhode Island RTK hazardous substances: Acetone Pennsylvania RTK: Acetone Florida: Acetone Minnesota: Acetone Massachusetts RTK: Acetone Massachusetts spill list: Acetone New Jersey: Acetone New Jersey spill list: Acetone Louisiana spill reporting: Acetone California List of Hazardous Substances (8 CCR 339): Acetone TSCA 8(b) inventory: Acetone TSCA 4(a) final test rules: Acetone TSCA 8(a) IUR: Acetone

Other Regulations:
OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada):
CLASS B-2: Flammable liquid with a flash point lower than 37.8°C (100°F). CLASS D-2B: Material causing other toxic effects (TOXIC).

DSCL (EEC):
R11- Highly flammable. R36- Irritating to eyes. S9- Keep container in a well-ventilated place. S16- Keep away from sources of ignition - No smoking. S26- In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 3

Reactivity: 0

Personal Protection: h

National Fire Protection Association (U.S.A.):

Health: 1

Flammability: 3

Reactivity: 0

Specific hazard:

Protective Equipment:
Gloves. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

Section 16: Other Information

References:
-Material safety data sheet issued by: la Commission de la SantÃ© et de la SÃ©curitÃ© du Travail du QuÃ©bec. -The Sigma-Aldrich Library of Chemical Safety Data, Edition II. -Hawley, G.G.. The Condensed Chemical Dictionary, 11e ed., New York N.Y., Van Nostrand Reinold, 1987. LOLI, RTECS, HSDB databases. Other MSDSs

Other Special Considerations: Not available.

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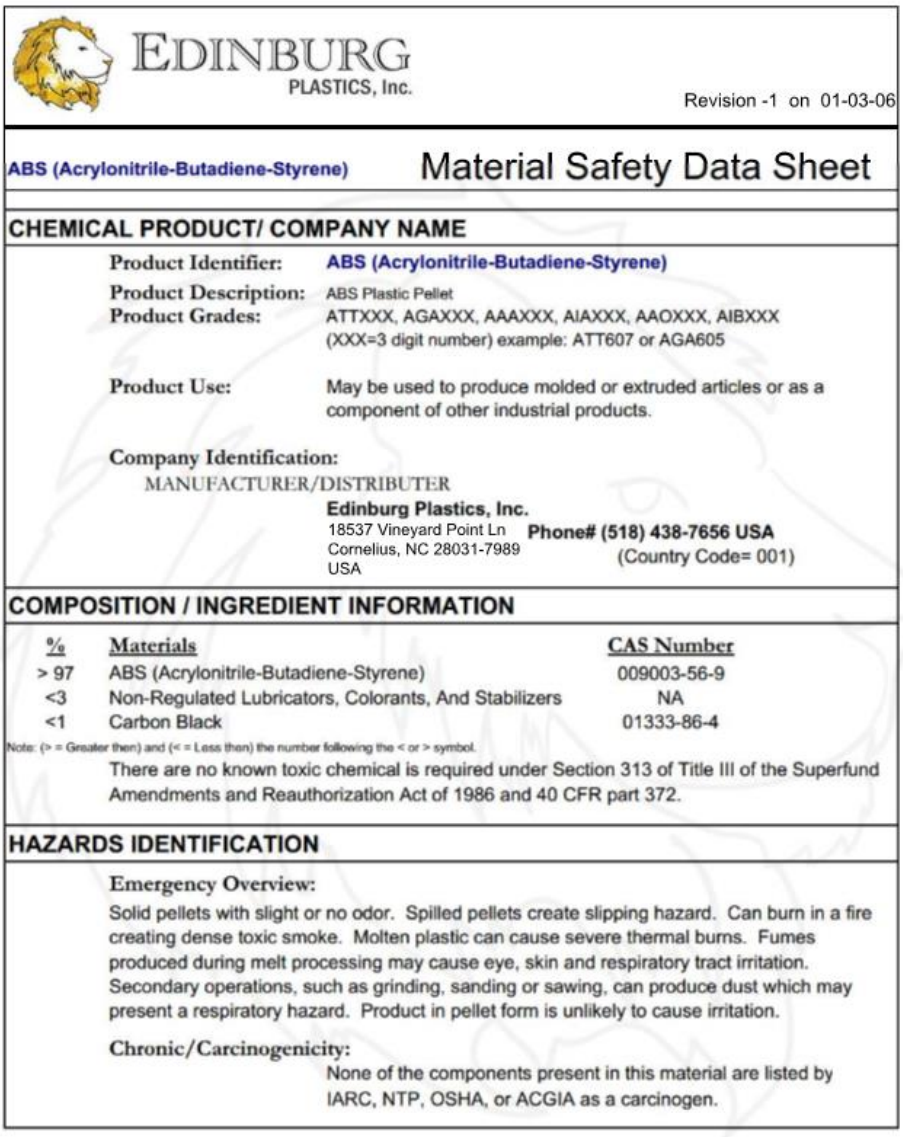
Acrylonitrile-Butadiene-Styrene (ABS)



EDINBURG
PLASTICS, Inc.

Revision -1 on 01-03-06

ABS (Acrylonitrile-Butadiene-Styrene) Material Safety Data Sheet

CHEMICAL PRODUCT/ COMPANY NAME

Product Identifier: ABS (Acrylonitrile-Butadiene-Styrene)

Product Description: ABS Plastic Pellet

Product Grades: ATTXXX, AGAXXX, AAAXXX, AIAXXX, AAOXXX, AIBXXX
(XXX=3 digit number) example: ATT607 or AGA605

Product Use: May be used to produce molded or extruded articles or as a component of other industrial products.

Company Identification:
MANUFACTURER/DISTRIBUTER

Edinburg Plastics, Inc.
18537 Vineyard Point Ln
Cornelius, NC 28031-7989
USA
Phone# (518) 438-7656 USA
(Country Code= 001)

COMPOSITION / INGREDIENT INFORMATION

%	Materials	CAS Number
> 97	ABS (Acrylonitrile-Butadiene-Styrene)	009003-56-9
<3	Non-Regulated Lubricators, Colorants, And Stabilizers	NA
<1	Carbon Black	01333-86-4

Note: (> = Greater then) and (< = Less then) the number following the < or > symbol.

There are no known toxic chemical is required under Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR part 372.

HAZARDS IDENTIFICATION

Emergency Overview:
Solid pellets with slight or no odor. Spilled pellets create slipping hazard. Can burn in a fire creating dense toxic smoke. Molten plastic can cause severe thermal burns. Fumes produced during melt processing may cause eye, skin and respiratory tract irritation. Secondary operations, such as grinding, sanding or sawing, can produce dust which may present a respiratory hazard. Product in pellet form is unlikely to cause irritation.

Chronic/Carcinogenicity:
None of the components present in this material are listed by IARC, NTP, OSHA, or ACGIA as a carcinogen.

MSDS
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Melt Processing Health Effects: Molten plastic can cause severe burns.

Processing fumes may cause irritation to the eyes, skin and respiratory tract, and in cases of severe overexposure, nausea and headache.

Medical Restrictions: There are no known human health effects aggravated by exposure to this product. However, certain sensitive individuals and individuals with respiratory impairments may be affected by exposure to components in the processing fumes.

FIRST AID MEASURES

Eyes: Immediately flush eyes with plenty of water for at least 15 minutes. Call a physician.

Skin: The compound is not likely to be hazardous by skin contact, but cleansing the skin after use is advisable. If molten polymer gets on skin, cool rapidly with cold water. do not attempt to peel polymer from skin. Obtain medical treatment for thermal burn.

Ingestion: No specific intervention is indicated as compound is not likely to be hazardous by ingestion. Consult a physician if necessary

Inhalation: No specific intervention is indicated as the compound is not likely to be hazardous by inhalation. Consult a physician if necessary. If exposed to fumes from overheating or combustion, move to fresh air. Consult a physician if symptoms persist.

For processing fume inhalation irritation, leave contaminated area and breathe fresh air. If coughing, difficult breathing or any other symptoms develop, seek medical attention at once, even if symptoms develop at a later time.

For skin contact with fume condensate, immediately wash thoroughly with soap and water. If irritation develops, seek medical attention.

FIRE FIGHTING MEASURES

Fire Fighting: Keep personnel removed and upwind of fire. Wear self-contained breathing apparatus and protective fire fighting clothing.

Extinguishing Media: Water (mist or light spray at first), Foam, Dry Chemical, CO_2

Hazardous Combustion Products: Hazardous gases/vapors produced in fire are: Phenolic compounds, nitrogen oxide, hydrogen bromide, carbon monoxide; small amounts of hydrogen cyanide and styrene.

Flash Point: > 404°C (759°F) Estimated

Auto-ignition Temperature: > 466°C (871°F) Estimated

ACCIDENTAL RELEASE MEASURES

General: Review FIRE FIGHTING MEASURES and HANDLING Sections.

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HANDLING AND STORAGE

Handling:	See FIRST AID and PERSONAL PROTECTIVE EQUIPMENT SECTIONS.
Storage:	Store in a cool, dry place. Keep containers tightly closed to prevent moisture absorption and contamination.

EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls:	Use local ventilation to control fumes from hot processing.
Personal Protection:	
Eye/Face:	Wear safety glasses. Wear coverall chemical splash goggles and face shield when possibility exists for eye and face contact due to splashing or spraying of molten material. A full face mask respirator provides protection from eye irritation.
Skin:	If there is potential contact with hot/molten material, wear heat resistant clothing and footwear.
Respiratory:	A NIOSH/MSHA approved air purifying respirator with an organic vapor cartridge with a dust/mist filter may be permissible under certain circumstances where airborne concentrations are expected to exceed exposure limits. Protection provided by air purifying respirator if there is any potential for an uncontrolled release, exposure levels are not known, or any other circumstances where air purifying respirators may not provide adequate protection.

PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Solid
Odor:	Possibly a slight organic odor
Melting Point:	>100°C (212°F)
Specific Gravity (water=1):	>1.02
Water Solubility:	Insoluble
%Volatiles:	Not Determined

STABILITY AND REACTIVITY

Stability:	Stable
Polymerization:	Polymerization will not occur
Conditions To Avoid:	Expoxure to open flame or temperatures >530°F for pro-longed time.
Incompatabilities:	Other Materials
Hazardous Decomposition:	Hazardous gases or vapors can be released, including Phenolic compounds, nitrogen oxide, hydrogen bromide, carbon monoxide; small amounts of hydrogen cyanide and styrene.

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ECOLOGICAL INFORMATION

AQUATIC TOXICITY: No information is available. Toxicity is expected to be low based on insolubility in water.

DISPOSAL INFORMATION

Waste Disposal: Preferred options for disposal are (1) recycling, (2) incineration with energy recovery, and (3) landfill. The high fuel value of this product makes option 2 very desirable for material that cannot be recycled, but incinerator must be capable of scrubbing out acidic combustion products. Treatment, storage, transportation, and disposal must be in accordance with applicable federal, state/provincial, and local regulations.

TRANSPORTATION INFORMATION

DOT Hazard Class: Not Regulated
Proper Shipping Name: Not Regulated
Identification Number: Not Listed

REGULATORY INFORMATION

TSCA Status: In compliance with TSCA Inventory requirements for commercial purposes.
WHMIS Classification: Not a controlled product.

This product does not contain reportable quantities of substances subject to supplier notification.

OTHER

Medical Use: **CAUTION:** Do not use in medical applications involving permanent implantation in the human body.
User Responsibility: Each user should read and understand this information and incorporate it into individual site safety programs in accordance with applicable hazard communication standards and regulations.

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Aluminum

Material Safety Data Sheet
Aluminum MSDS

Section 1: Chemical Product and Company Identification

Product Name: Aluminum

Catalog Codes: SLA4735, SLA2389, SLA3895, SLA1549, SLA3055, SLA4558, SLA2212, SLA3715

CAS#: 7429-90-5

RTECS: BD0330000

TSCA: TSCA 8(b) inventory: Aluminum

CI#: Not applicable.

Synonym: Aluminum metal pellets; Aluminum metal sheet; Aluminum metal shot; Aluminum metal wire

Chemical Name: Aluminum

Chemical Formula: Al

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call: 1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Aluminum	7429-90-5	100

Toxicological Data on Ingredients: Aluminum LD50: Not available. LC50: Not available.

Section 3: Hazards Identification

Potential Acute Health Effects:
Slightly hazardous in case of skin contact (irritant). Non-irritating to the eyes. Non-hazardous in case of ingestion.

Potential Chronic Health Effects:
CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance is toxic to lungs. Repeated or prolonged exposure to the substance can produce target organs damage. Repeated exposure to a highly toxic material may produce general deterioration of health by an accumulation in one or many human organs.

Section 4: First Aid Measures

Eye Contact:

p. 1

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention if irritation occurs.

Skin Contact: Wash with soap and water. Cover the irritated skin with an emollient. Get medical attention if irritation develops.

Serious Skin Contact: Not available.

Inhalation:
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.

Serious Inhalation: Not available.

Ingestion:
Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Non-flammable.

Auto-Ignition Temperature: Not available.

Flash Points: Not available.

Flammable Limits: Not available.

Products of Combustion: Some metallic oxides.

Fire Hazards in Presence of Various Substances: Not available.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:
SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

Special Remarks on Fire Hazards: Not available.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill:
Use appropriate tools to put the spilled solid in a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and dispose of according to local and regional authority requirements.

Large Spill:
Use a shovel to put the material into a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and allow to evacuate through the sanitary system.

Section 7: Handling and Storage

Precautions:
Do not ingest. Wear suitable protective clothing. If ingested, seek medical advice immediately and show the container or the label. Keep away from incompatibles such as oxidizing agents, acids, alkalis.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area. Moisture sensitive.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection: Safety glasses. Lab coat. Gloves.

Personal Protection in Case of a Large Spill: Safety glasses. Lab coat. Gloves.

Exposure Limits:
TWA: 5 (mg(Al)/m) from ACGIH (TLV) [United States] Inhalation (pyro powders, welding fumes) TWA: 10 (mg(Al)/m) from ACGIH (TLV) [United States] Inhalation (metal dust) Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid.

Odor: Odorless.

Taste: Not available.

Molecular Weight: 26.98 g/mole

Color: Silver-white

pH (1% soln/water): Not applicable.

Boiling Point: 2327°C (4220.6°F)

Melting Point: 660°C (1220°F)

Critical Temperature: Not available.

Specific Gravity: Density: 2.7 (Water = 1)

Vapor Pressure: Not applicable.

Vapor Density: Not available.

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility:
Insoluble in cold water, hot water. Soluble in alkalies, Sulfuric acid, Hydrochloric acid. Insoluble in concentrated Nitric Acid, hot Acetic acid.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Incompatible materials, exposure to moist air or water.

Incompatibility with various substances: Reactive with oxidizing agents, acids, alkalis.

Corrosivity: Not available.

Special Remarks on Reactivity:
Moisture sensitive. Aluminum reacts vigorously with Sodium Hydroxide. Aluminum is also incompatible with strong oxdizers, acids, chromic anhydride, iodine, carbon disulfide, methyl chloride, and halogenated hydrocarbons, acid chlorides, ammonium nitrate, ammonium persulfate, antimony, arsenic oxides, barium bromate, barium chlorate, barium iodate, metal salts

Special Remarks on Corrosivity:
In moist air, oxide film forms which protects metal from corrosion. Aluminum is strongly electropositive so that it corrodes rapidly in contact with other metals.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Not available.

Toxicity to Animals: Not available

Chronic Effects on Humans: Not available.

Other Toxic Effects on Humans:
Slightly hazardous in case of skin contact (irritant). Non-hazardous in case of ingestion. Non-hazardous in case of inhalation.

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Not available.

Special Remarks on other Toxic Effects on Humans:
Acute Potential Health Effects: Skin: Exposure to aluminum may cause skin irritation. Eyes: Not expected to be a hazard unless aluminum dust particles are present. Exposure to aluminum dust may cause eye irritation by mechanical action. Aluminum particles deposited in the eye are generally innocous. Inhalation: Not expected to be an inhalation hazard unless it is heatedor if aluminum dust is present It heated or in dust form, it may cause respiratory tract irritation. Heating Aluminum can release Aluminum Oxide fumes and cause fume metal fever when inhaled. This is a flu-like illness with symptoms of metallic taste, fever, chills, aches, chest tightness, and cough. Ingestion: Acute aluminum toxicity is unlikely. Chronic Potential Health Effects: Skin: Contact dermatitis occurs rarely after aluminum exposure. Most cases of aluminum toxicity in humans are in one of two categories: patients with chronic renal failure, or people exposed to aluminum fumes or dust in the workplace. The main source of aluminum in people with chronic renal failure was in the high aluminum content of the water for the dialysate used for dialysis in the 1970's. Even though this problem was recognized and corrected, aluminum toxicity continues to occur in some individuals with renal who chronically ingest aluminum-containing phosphate binders or antacids. Inhalation: Chronic exposure to aluminum dust may cause dyspnea, cough, asthma, chronic obstructive lung disease, pulmonary fibrosis, pneumothorax, pneumoconiosis, encephalopathy, weakness, incoordination and epileptiform seizures and other neurological symptoms similar to that described for chronic ingestion. Hepatic necrosis is also a reported effect of exposure to airborne particulates carrying aluminum. Ingestion: Chronic ingestion of aluminum may cause Aluminum Related Bone Disease or aluminum-induced Osteomalacia with fracturing Osteodystrophy, microcytic anemia, weakness, fatigue, visual and auditory hallucinations, memory loss, speech and language impairment (dysarthria, stuttering, stammering, anomia, hypofluency, aphasia and eventually, mutism), epileptic seizures(focal or grand mal), motor disturbance(tremors, myoclonic jerks, ataxia, convulsions, asterixis, motor apraxia, muscle fatigue), and dementia (personality changes, altered mood, depression, diminished alertness, lethargy, 'clouding of the sensorium', intellectual deterioration, obtundation, coma), and altered EEG.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are less toxic than the product itself.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:
Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: Not a DOT controlled material (United States).

Identification: Not applicable.

Special Provisions for Transport: Not applicable.

Section 15: Other Regulatory Information

Federal and State Regulations:
California prop. 65: This product contains the following ingredients for which the State of California has found to cause birth defects which would require a warning under the statute: No products were found. California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer which would require a warning under the statute: No products were found. Connecticut hazardous material survey.: Aluminum Illinois toxic substances disclosure to employee act: Aluminum Rhode Island RTK hazardous substances: Aluminum Pennsylvania RTK: Aluminum Minnesota: Aluminum Massachusetts RTK: Aluminum New Jersey: Aluminum New Jersey spill list: Aluminum California Director's List of Hazardous Substances: Aluminum TSCA 8(b) inventory: Aluminum SARA 313 toxic chemical notification and release reporting: Aluminum

Other Regulations:
OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada): Not controlled under WHMIS (Canada).

DSCL (EEC):

HMIS (U.S.A.):

Health Hazard: 1

Fire Hazard: 0

Reactivity: 0

Personal Protection: B

National Fire Protection Association (U.S.A.):

Health: 1

Flammability: 1

Reactivity: 0

Specific hazard:

Protective Equipment:
Gloves. Lab coat. Not applicable. Safety glasses.

Section 16: Other Information

References:

-Hawley, G.G.. The Condensed Chemical Dictionary, 11e ed., New York N.Y., Van Nostrand Reinold, 1987. -Material safety data sheet emitted by: la Commission de la Santé et de la Sécurité du Travail du Québec. -SAX, N.I. Dangerous Properties of Indutrial Materials. Toronto, Van Nostrand Reinold, 6e ed. 1984. -The Sigma-Aldrich Library of Chemical Safety Data, Edition II. -Guide de la loi et du règlement sur le transport des marchandises dangeureuses au canada. Centre de conformité internatinal Ltée. 1986. 037 Waste manifest or notification not required.

Other Special Considerations: Not available.

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Ammonium Perchlorate

1. PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: Ammonium Perchlorate

OTHER/GENERIC NAMES: AP, ammonium salt of perchloric acid,

PRODUCT USE: Analytical chemistry, oxidizer in various propellant or explosive mixtures, various industrial uses involving need for oxidizing or ionization in aqueous solution properties.

MANUFACTURER: American Pacific Corporation, Western Electrochemical Co. 10622 West 6400 North, Cedar City, UT 84721

FOR MORE INFORMATION CALL: (435) 865-5000

IN CASE OF EMERGENCY CALL: (435) 865-5044

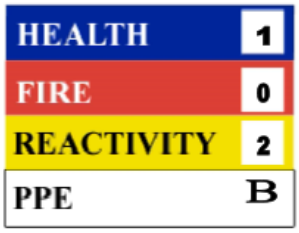
2. COMPOSITION/INFORMATION ON INGREDIENTS

INGREDIENT NAME	CAS NUMBER	EINECS NUMBER	WEIGHT %
Ammonium Perchlorate	7790-98-9	232-235-1	~100

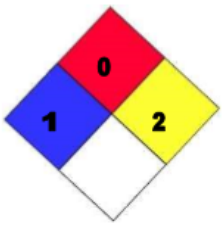
OSHA Hazard Communication Standard:

This product is considered hazardous under the OSHA Hazard Communication Standard. The stated hazards classifications are applicable to the ammonium perchlorate as manufactured by AMPAC and as delivered in the DOT/UN approved shipping containers. Any rework, modification, amending or additional processing of the ammonium perchlorate may change the hazards classification and may require further hazards classification testing to determine the appropriate classification. AMPAC will not be responsible for personnel or property damage caused by a failure to conduct or provide adequate safe measures needed due to any individual company's production activities.

3. HAZARDS IDENTIFICATION



HMIS



NFPA

EMERGENCY OVERVIEW: An odorless white crystal material. Perchlorate is an Oxidizing Agent; there is a risk of explosion if heated under confinement. As with any toxicant, dose and exposure are critically important variables to understand any potential treatment.

Harmful if swallowed or inhaled in large doses.

Potential health effects:

Acute eye: irritation, redness, tearing
Acute skin: Irritating to mucous membranes and skin
Acute inhalation: may cause respiratory tract irritation; coughing, and shortness of breath; high concentrations may cause more significant respiratory effects
Acute ingestion: may cause gastrointestinal irritation; larger doses my cause nausea and vomiting.

Potential chronic effects

Perchlorates act to reversibly and competitively inhibit iodine uptake by the thyroid gland. Perchlorate is soluble in water, so exposure to ammonium perchlorate can be via water contaminated with ammonium perchlorate or inhalation in the workplace.

With chronic exposure given sufficient dose (see NRC, 2005) and duration, ammonium perchlorate can cause thyroidal stores of iodine to be reduced, which may lead to hypothyroidism. For those individuals that live in areas of the world where endemic iodine deficiency occurs, it is important that these people receive adequate iodine in the diet or are supplemented with iodine.

Information pertaining to particular dangers for man and environment

May be explosive when mixed with combustible material. Risk of explosion if heated under confinement.

Additional region specific information

European Union:

EC Risk Phrase O; R 9, R 44 **EC Safety Phrase** S: (2-) 14-16-27-36/37

Canada:

Canadian WHMIS Class C, Oxidizing material

4. FIRST AID MEASURES

Routes of exposure	Signs and symptoms of exposure:	Emergency and first aid procedures:
SKIN:	May cause local irritation or stinging effect.	Wash exposed area immediately with plenty of water. Remove contaminated clothing and footwear.
INHALATION:	Airborne concentrations of ammonium perchlorate can aggravate pre-existing respiratory problems.	If experiencing breathing difficulties, move to fresh air. Administer oxygen if exposed person is unconscious. Never give anything by mouth to an unconscious person.
INGESTION:	Ingestion of large quantities has been reported to cause staggering in small mammals. Chronic ingestion of sufficient quantities may interfere with uptake of iodine by the thyroid.	Give water. Induce vomiting, keep airway clear. Seek medical attention.
EYES:	Irritation of the eyes will cause stinging effect.	Flush eyes with fresh water for at least 15 minutes and move exposed person to a non-contaminated area.

5. FIRE FIGHTING MEASURES

FLAMMABLE PROPERTIES

FLASH POINT: Not flammable.
FLASH POINT METHOD: Not applicable.
AUTOIGNITION TEMPERATURE: Not applicable. Ammonium perchlorate decomposes spontaneously at 300° C in its pure state. Contaminants may cause decomposition at lower temperatures typically down to 270°C but decomposition temperature has been listed as low as 240°C in one case
UPPER FLAMMABILITY LIMIT (volume % in air): Not applicable.
LOWER FLAMMABILITY LIMIT (volume % in air): Not applicable.

EXTINGUISHING MEDIA: Water - other extinguishing materials are ineffective

UNUSUAL FIRE AND EXPLOSION HAZARDS: Ammonium perchlorate is an oxidizing agent and may cause rapid combustion or explosions if mixed with fuels, including organic materials or powdered metals. This does not include DOT shipping containers if intimate mixtures are not present and the shipping container is not inordinately contaminated. Plastic containers have been observed to burn and leave standing cylinders of ammonium perchlorate. Molten metal from aluminum containers may contribute fuel in an instance hot enough to melt aluminum.

SPECIAL FIRE FIGHTING PRECAUTIONS/INSTRUCTIONS: Do not fight fires involving mixtures of ammonium perchlorate and fuels. Ammonium perchlorate is an oxidizing agent and may cause rapid combustion or explosions if mixed with fuels. Burning ammonium perchlorate may produce chlorine, chlorine dioxide, hydrogen chloride, and oxides of nitrogen as well as mixtures with any other compounds involved in the combustion. These are common by-products of combustion and are likely to be serious health concern; thus, keep upwind or wear self-contained breathing apparatus when attempting to rescue.

6. ACCIDENTAL RELEASE MEASURES

IN CASE OF SPILL OR OTHER RELEASE: (See section 8 for recommended personal protective equipment.) Sweep up material and containerize. Clean contaminated floor surface with water. Ammonium perchlorate is water soluble; thus, manage water to avoid release into the environment. Dispose of in accordance with local, state, and federal regulations.

Spills and releases may have to be reported to Federal or other Governmental Authorities and/or local authorities. See Section 15 regarding reporting requirements.

7. HANDLING AND STORAGE

NORMAL HANDLING: (See section 8 for recommended personal protective equipment.) Avoid contact with skin, eyes and clothing. Avoid breathing dust. Wash thoroughly after handling and follow good personal hygiene and good housekeeping practices. Keep containers closed. Handle in a manner to minimize dusting. Use of containers that meet the requirements to be DOT approved shipping containers which are managed in a manner to inhibit intimate mixtures of the container material with the product is recommended. Materials such as plastic drums, steel drums, flexible intermediate bulk containers, and fiberboard containers approved or constructed to the same specifications as DOT requirements are normally safe. FIBC are normally constructed of plastic materials in which intimate contamination soaked into the plastic is difficult to achieve. If in doubt wet and wash the FIBC and manage the water used to wash in accordance with good environmental principles to avoid contaminating drinking water sources or organic materials more subject to intimate mixtures.

STORAGE RECOMMENDATIONS: Store away from combustibles and flammables. Keep container closed when not in use. Control static electricity and other ignition sources. Store in dry areas away from sources of extreme heat.

SPECIAL MIXING AND HANDLING INSTRUCTIONS: Ground and bond process equipment. Mixing ammonium perchlorate with fuels of any type may result in rapid combustion or explosions. When handling materials contaminated with ammonium perchlorate such as dust collector bags or any other combustible material, thoroughly wet the bags with water before handling, keep the bags wet while handling, and use non-sparking tools or tools coated with non-sparking material if non-sparking tools are not available. AVOID friction, impact, or static electricity ignition sources when organic materials are contaminated with ammonium perchlorate. Fire resistant fabrics do not reduce the hazard. Finely powdered metals are frequently as combustible with ammonium perchlorate as are organics.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

ENGINEERING CONTROLS: Ventilate as necessary to minimize dust exposures. Inspect and clean ventilation systems regularly.

PERSONAL PROTECTIVE EQUIPMENT

SKIN PROTECTION:. Wear impervious aprons or rain gear to reduce contamination of cotton or other fiber clothing. Plastic, rubber or latex gloves are recommended. Leather or cotton gloves should not be used unless a management program is implemented to ensure detection of contamination and immediate cleaning and change in case of contamination. Cotton clothing may be used if chance of contact is minimal or if clothing is monitored for contamination and changed if contamination occurs. In any case where combustible protection is used, a strong management system must be in place to monitor contamination and ensure appropriate removal and cleaning or severe risk of fire and personal injury or death exists. There are no known cloth materials that will not combust vigorously with perchlorates including nomex, Kevlar based materials, or clothing that is normally considered fire retardant or resistive. Observation and management of contamination is the only practicable safety measure. See additional recommendations below.

EYE PROTECTION: Under normal conditions, wear safety glasses. Under dusty conditions, wear chemical safety goggles.

RESPIRATORY PROTECTION: Under normal conditions, not required. Where dusty conditions develop, use a NIOSH-approved respirator for dusts.

ADDITIONAL RECOMMENDATIONS: Avoid contamination of cotton or other absorbent material. As in any industrial working environment, workers should routinely wear clean clothes to work. Do not wear any work clothing that has become contaminated with ammonium perchlorate. Remove contaminated clothing immediately and keep wet until thoroughly washed. Keeping contaminated clothing wet minimizes hazards until the laundering is completed. Showering is recommended after handling any industrial chemical. Smoking of tobacco should not be permitted while wearing contaminated clothing. Leather boots may become contaminated and could be a source of combustion damaging feet. Rubber boots are recommended unless a very strict management program to detect contaminated leather boots is in place much as listed on the glove section above.

EXPOSURE GUIDELINES

INGREDIENT NAME	ACGIH TWA	OSHA PEL TWA
Ammonium Perchlorate	10 mg/m3 (Nuisance Dust)	15 mg/m3 (Nuisance Dust)

9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE: White crystal	**PHYSICAL STATE:** Solid	**MOLECULAR WEIGHT:** 117.50	**CHEMICAL FORMULA:** NH_4ClO_4	**ODOR:** No odor
SPECIFIC GRAVITY (water = 1.0): 1.95	**SOLUBILITY IN WATER (weight %):** 20.8 g/100 ml at 20°C	**pH: materials is a solid however,** dissolved in water the pH is slightly acidic	**BOILING POINT:** Not applicable, Decomposes	**MELTING POINT:** Decomposes at 300°C in its pure state, impurities may lower the decomposition temperature significantly.
VAPOR PRESSURE: Solid, Not applicable	**VAPOR DENSITY (air = 1.0):** at 20 ° C Not applicable[3]	**EVAPORATION RATE:** Not Applicable		
FLASH POINT: Not flammable (Flash point method and additional flammability data are found in Section 5.)				

10. STABILITY AND REACTIVITY

NORMALLY STABLE (CONDITIONS TO AVOID):
Stable under normal conditions. Do not mix with organic materials, reducing agents, metal powders or powdered carbon. Avoid elevated temperatures over 270°C, which can cause spontaneous exothermic decomposition. Cloth fabric of any type including dust collector bags intimately contaminated with ammonium perchlorate is subject to ignition through friction or impact. High-energy static electricity may also serve as an ignition source when contamination or combustibles are intermixed.

INCOMPATIBILITIES: Sulfuric acid, powdered metals, and intimate mixtures with organics.

HAZARDOUS DECOMPOSITION PRODUCTS: Chlorine, chlorine dioxide, oxygen, nitrogen oxides, hydrogen chloride.

HAZARDOUS POLYMERIZATION: Will not occur.

11. TOXICOLOGICAL INFORMATION

As with any toxicant, dose and exposure are critically important variables to understand any potential toxicity. It is always advisable to minimize dusting and use respiratory protection for environments where substantial dust is generated or where there may be exposure to water with high concentrations of perchlorate.

Ammonium perchlorate acts to reversibly and competitively inhibit iodine uptake by the thyroid gland. The half-life of ammonium perchlorate ranges from 8 to 12 hours. Ammonium perchlorate does not bioaccumulate. Perchlorate is not metabolized and is excreted from the kidneys.

Harmful if swallowed or inhaled in large doses. In the early 1960s another salt of perchlorate, potassium perchlorate, given in very high doses for weeks of exposure as an oral therapeutic agent to treat hyperthyroidism was reported to be associated with a few cases of aplastic anemia and agranulocytosis (National Research Council, 2005). Since that time, there have been no known reports of aplastic anemia. There have been no reports of ammonium perchlorate associated with aplastic anemia or agranulocytosis.

IMMEDIATE (ACUTE) EFFECTS:

Oral LD50: rat; 4200 mg/kg Rat-par-LDLo = 3500 mg/kg
Oral LD50: rabbit; 1900 mg/kg Rabbit-par-LDLo = 750 mg/kg
Inhalation LC50: No references found.
Skin sensitization: not reported to be a skin sensitizer

DELAYED (SUBCHRONIC AND CHRONIC) EFFECTS:

Thyroid

No long-term health effects have been reported with exposure to ammonium perchlorate. Perchlorate is water soluble, so exposure to ammonium perchlorate can be via water contaminated with ammonium perchlorate or inhalation in the workplace. With chronic exposure, sufficient dose, and duration, ammonium perchlorate may cause thyroidal stores of iodine to be reduced, which may lead to goiter (enlarged thyroid gland) and hypothyroidism. Occupational studies indicated no adverse health effects on workers exposed for 3 years or more to perchlorate. These studies also demonstrate that blood chemistry and hormone values are not altered with occupational exposures as high as 0.48 mg per kilogram body weight (Braverman et al., 2005; Lamm et al., 1999). In 2005, a National Academies of Science Committee reviewed the literature and oral exposures to perchlorate and identified a no-observable-adverse-effect-level 0.4 mg/kg/day in humans. That dose is inhibits iodide uptake by nearly 70 percent without effecting thyroid hormones or thyroid stimulating hormone. The NAS also identified a no-observed-effect-level of 0.007 mg/kg/day in humans, based on Greer, et. al. 2002, which is a dose that does not cause inhibition of iodide uptake. For those individuals that live in areas of the world where endemic iodine deficiency occurs, it is important that these people receive adequate iodine in the diet or are supplemented with iodine.

Carcinogen: IARC: NO NTP: NO OSHA: NO

Reproductive

In 2005, the California Environmental Protection Agency's Office of Environmental Health Hazard Assessment (OEHHA) Developmental and Reproductive Toxicology Identification (DART) Committee concluded that available scientific information on perchlorate was not sufficient for placing the substance on a list (Prop 65) list of chemicals known to the State of California to cause birth defects or other reproductive harm.

Immunology

Extensive immunotoxicity studies in mice revealed no changes in immunologic function in response to perchlorate exposure (Keil et al. 1998, 1999)

Other Medical conditions aggravated by exposure: Excessive dust inhalation can aggravate respiratory conditions

12. ECOLOGICAL INFORMATION

Limited data available – perchlorate ion is persistent but can be decomposed by naturally occurring bacteria in anoxic conditions in the presence of a suitable electron donor. Some additional data appears above in the Toxicity data section 11.

Toxicity Data: Daphnia Magna Acute 48-hour LC_{50} 490 mg/l water with sodium perchlorate
Pimephales Promelas Acute 96 hour LC_{50} 1655 mg/l water with sodium perchlorate
Ceriodaphnia dubia Chronic 6 day LC_{50} 77.8 mg/l water with ammonium perchlorate
Pimephales promelas Subchronic 7 day LC_{50} 270 mg/l water with ammonium perchlorate
Latuca Sativa Subchronic 7 day LC_{50} 614 mg/kg soil
Eisenia Foetida Acute 7 day LC_{50} 4450 mg/kg soil

13. DISPOSAL CONSIDERATIONS

RCRA

Is the unused product a RCRA hazardous waste if discarded? Yes –if discarded as a solid and not in solution. If discarded as a solution carefully evaluate before any determination of waste status to avoid misinterpretation. Caution: Intentionally placing solid material into solution to dispose of it may violate several regulations if not managed carefully thereafter. Various states have local regulations that are applicable and are changing. Evaluate carefully all applicable regulations for your location before determining status and method of disposal!

If yes, the RCRA ID number is: D001

California has imposed a best management practice standard for reporting, handling, storage and disposal and requires the following on container labels or on MSDS:

California: Requirements for labeling: "Perchlorate Material – special handling may apply, See www.dtsc.ca.gov/hazardouswaste/perchlorate

European Union and Canada – check national and local regulations for disposal of both oxidizers and for the specific substance before disposal – follow all regulatory requirements.

OTHER DISPOSAL CONSIDERATIONS: The information offered in section 13 is for the product as shipped. Use and/or

alterations to the product such as mixing with other materials may significantly change the characteristics of the material and alter the RCRA classification and the proper disposal method.

14. TRANSPORT INFORMATION

US DOT HAZARD CLASS, PACK GROUP: Oxidizer 5.1, PG II	**UN NUMBER:** 1442	**CAS number:** 7790-98-9	**PROPER SHIPPING NAME:** Ammonium Perchlorate
EC (EINECS/ELINCS) 232-235-1	**EC Index Number** 017-009-00-0		**EC Class** Oxidizing; Risk of explosion if heated under confinement
EC Risk Phrase O; R 9 R 44	**EC Safety Phrase** S: (2-) 14-16-27-36/37		**ENCS (MITI)** 1-220
Canadian WHMIS: Class C oxidizing material	**Canadian WHMIS SYMBOL:**		
RTECS SC7520000	**RTECS class** Drug (D)		**Merck** 12,574

For additional information on shipping regulations affecting this material, contact the information number found in Section 1. Note: AMPAC, the parent of Western Electrochemical Co. Division has performed tests as required and applied to DOT and received approvals listed at the right for various grades of AP as 5.1 oxidizer as shown to the right. Other AP does not automatically meet this classification and would require testing and DOT approval to achieve a 5.1 oxidizer class as covered in 49CFR172 Hazardous materials Table with special provision 107 for ammonium perchlorate and subsequent information covered in note 107 at 49 CFR172.102. This requirement is supplemented by 49 CFR173.57 and 173.58 as described in note 107. These exemptions are specific to the facility located at 10622 West 6400 North, Cedar City, Utah 84720 Ammonium perchlorate Propellant grade 170 micron and greater has received classification as a 5.1 oxidizer under EX 2003110036.
Ammonium perchlorate propellant grade with average particle size of 70 microns and larger; Ammonium perchlorate wetted with not less than 5% water, and Ammonium perchlorate, non-propellant grade, with average particle size 70 microns and larger has received classification as a 5.1 oxidizer under EX2004020234
Both exemptions have container and weight restrictions and are not directly transferable to any other parties without application to and approval of DOT through the RSPA office or its successor office.

15. REGULATORY INFORMATION

TOXIC SUBSTANCES CONTROL ACT (TSCA)
TSCA INVENTORY STATUS: Listed on the TSCA Inventory.
OTHER TSCA ISSUES: None

SARA TITLE III/CERCLA "Reportable Quantities" (RQs) and/or "Threshold Planning Quantities" (TPQs) exist for the following ingredients.		
INGREDIENT NAME	SARA/CERCLA RQ (lb)	SARA EHS TPQ (lb)
No ingredients listed in this section. No listing on the EPA list of lists.		
Spills or releases resulting in the loss of any ingredient at or above its RQ requires immediate notification to the National Response Center [(800) 424-8802] and to your Local Emergency Planning Committee.		
SARA 313 TOXIC CHEMICALS: The following ingredients are SARA 313 "Toxic Chemicals" and may be subject to annual reporting requirements. CAS numbers and weight percents are found in Section 2.		
INGREDIENT NAME	SARA/CERCLA RQ (lb)	SARA EHS TPQ (lb)
No ingredients listed in this section.		
STATE RIGHT-TO-KNOW In addition to the ingredients found in Section 2, the following are listed for state right-to-know purposes.		
INGREDIENT NAME	SARA/CERCLA RQ (lb)	SARA EHS TPQ (lb)
Ammonium Perchlorate	Examine local regulations to determine	Examine local regulations to determine
Due to the rapidly changing regulatory environment in individual states, it is very difficult to maintain up to date information for each state in a material safety data sheet. The user must examine the local regulations in force and comply with all requirements.		
California: Requirements for labeling: "Perchlorate Material – special handling may apply, See www.dtsc.ca.gov/hazardouswaste/perchlorate."		

ADDITIONAL REGULATORY INFORMATION:
Hazard symbols: O Oxidizing
Risk phrases: 9 Explosive when mixed with combustible material.
44 Risk of explosion if heated under confinement.

Safety phrases:
14 Keep away from flammable organic substances
16 Keep away from sources of ignition - No smoking.
27 Take off immediately all contaminated clothing.
36/37 Wear suitable protective clothing and gloves.

Regulations

Listed on the Toxic Substances Control Act (TSCA).
Listed in US RTECS and in US EPA IRIS database

Listed under EINECS

Listed on Canadian Domestic Substances List (DSL).

Listed on Australian Inventory of Chemical Substances (AICS).

Information about limitation of use: For use only by technically qualified individuals. **Export is controlled by the US government and may be restricted in other nations. No use in conflict with a granted export license is permitted.**

United States OSHA: Ammonium perchlorate is on the list of process safety management chemicals with a threshold quantity of 7500 pounds 29 CFR 1910.119

Canadian WHMIS: Ammonium Perchlorate is a Class C oxidizer under WHMIS and requires the warning symbol:

16. OTHER INFORMATION

CURRENT ISSUE DATE: January 2, 2013

PREVIOUS ISSUE DATE: May 25, 2010

CHANGES TO MSDS FROM PREVIOUS ISSUE DATE ARE DUE TO THE FOLLOWING: Three year review. Reviewed and found no changes which are required at this time.

OTHER INFORMATION: Not for Food or Drug Use. The user is responsible to evaluate the safety and environmental consequences of any intended uses. The manufacturer assumes no liability for any usages that result in adverse consequences.

IMPORTANT: The information presented herein, while not guaranteed, was prepared by competent technical personnel and is true and accurate to the best of our knowledge. NO WARRANTY OR GUARANTEE, EXPRESS OR IMPLIED, IS MADE REGARDING PERFORMANCE, STABILITY OR

OTHERWISE. This information is not intended to be all-inclusive as to the manner and conditions of use, handling and storage. Other factors may involve other or additional safety or performance considerations. While our technical personnel will be happy to respond to questions regarding safe handling and use procedures, safe handling and use remains the responsibility of the customer. No suggestions for use are intended as, and nothing herein shall be construed as a recommendation to infringe any existing patents or violate any Federal, Other National Governmental Entity, State, Provincial, or local laws.

References

Keil, D., A. Warren, M. Jenny, J. EuDaly, and R. Dillard. 1998. Effects of Ammonium Perchlorate on Immunotoxicological, Hematological, and Thyroid Parameters in B6C3F1 Female Mice. DSWA01-97-0008. Medical University of South Carolina, Charleston, SC. September 30, 1998. [Online]. Available: http://www.epa.gov/ncea/perchlorate/references2/documents/44966.pdf [accessed Feb, 6, 2006.]

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Gibbs, J.P., R. Ahmad, K.S. Crump, D.P. Houck, T.S. Leveille, J.E. Findlay, and M. Francis. 1998. Evaluation of a population with occupational exposure to airborne ammonium perchlorate for possible acute or chronic effects in thyroid function. J. Occup. Environ. Med. 40(12):1072-1082.

National Research Council, 2005. Health Implications of Perchlorate Ingestion, National Academy of Sciences, The National Academies Press, Washington, DC., January.

Black Powder

Goex Powder, Inc.

Material Safety Data Sheet

MSDS-BP (Potassium Nitrate)

Revised 3/17/09

PRODUCT INFORMATION	
Product Name	Black Powder
Trade Names and Synonyms	N/A
Manufacturer/Distributor	GOEX Powder, Inc.(DOYLINE, LA) & various international sources
Transportation Emergency	800-255-3924 (24 hrs – CHEM TEL)

PREVENTION OF ACCIDENTS IN THE USE OF EXPLOSIVES

The prevention of accidents in the use of explosives is a result of careful planning and observance of the best known practices. The explosives user must remember that he is dealing with a powerful force and that various devices and methods have been developed to assist him in directing this force. He should realize that this force, if misdirected, may either kill or injure both him and his fellow workers.

WARNING

All explosives are dangerous and must be carefully transported, handled, stored, and used following proper safety procedures either by or under the direction of competent, experienced persons in accordance with all applicable federal, state and local laws, regulations, or ordinances. ALWAYS lock up explosive materials and keep away from children and unauthorized persons. If you have any questions or doubts as to how to use any explosive product, DO NOT USE IT before consulting with your supervisor, or the manufacturer, if you do not have a supervisor. If your supervisor has any questions or doubts, he should consult the manufacturer before use.

HAZARDOUS COMPONENTS				
Material or Components	%	CAS NO.	TLV	PEL
Potassium nitrate	70-76	007757-79-1	NE	NE
Charcoal	8-18	N/A	NE	NE
Sulfur	9-20	007704-34-9	NE	NE
Graphite[1]	Trace	007782-42-5	15 mppct (TWA)	2.5 mg/m³
N/A = Not assigned NE = Not established				

[1] Not contained in all grades of black powder.

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P.O. Box 659, Doyline, LA 71023-0659, (318) 382-9300
www.goexpowder.com

PHYSICAL DATA	
Boiling Point	N/A
Vapor Pressure	N/A
Vapor Density	N/A
Solubility in Water	Good
Specific Gravity	1.70 – 1.82 (mercury method) 1.92 – 2.08 (pycnometer)
PH	6.0 – 8.0
Evaporation Rate	N/A
Appearance and Odor	Black granular powder. No odor detectable.

HAZARDOUS REACTIVITY	
Instability	Keep away from heat, sparks, and open flames. Avoid impact, friction and static electricity.
Incompatibility	When dry, black powder is compatible with most metals; however, it is hygroscopic and when wet, attacks all common metals except stainless steel. Black powder must be tested for compatibility with any material not specified in the production/procurement package with which they may come in contact. Materials include other explosives, solvents, adhesives, metals, plastics, paints, cleaning compounds, floor and table coverings, packing materials, and other similar materials, situations, and equipment.
Hazardous decomposition	Detonation produces hazardous overpressures and fragments (if confined). Gases produced may be toxic if exposed in areas with inadequate ventilation.
Polymerization	Polymerization will not occur.

FIRE AND EXPLOSION DATA	
Flashpoint	Not applicable
Auto Ignition Temperature	Approx. Range: 392°F-867°F / 200°C-464°C
Explosive temperature (5 sec)	Ignites @ approx. 427°C (801°F)
Extinguishing media	Water
Special fire fighting procedures	ALL EXPLOSIVES: DO NOT FIGHT EXPLOSIVES FIRES. Try to keep fire from reaching explosives. Isolate area. Guard against intruders. Division 1.1 Explosives (heavily encased): Evacuate the area for 5,000 feet (approximately 1 mile) if explosives are heavily encased. Division 1.1 Explosives (not heavily encased): Evacuate the area for 2,500 feet (approximately ½ mile) if explosives are not heavily encased. Division 1.1 Explosives (all): Consult U.S. DOT Emergency Response Guide 112 for further details.

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Unusual fire and explosion hazards	Black powder is a deflagrating explosive. It is very sensitive to flame and spark and can also be ignited by friction and impact. When ignited unconfined, it burns with explosive violence and will explode if ignited under even slight confinement.

HEALTH HAZARDS	
General	Black powder is a Division 1.1 Explosive, and detonation may cause severe physical injury, including death. All explosives are dangerous and must be handled carefully and used following approved safety procedures under the direction of competent, experienced persons in accordance with all applicable federal, state and local laws, regulation and ordinances.
Carcinogenicity	None of the components of Black Powder are listed as a carcinogen by NTP, IARC, or OSHA.

FIRST AID	
Inhalation	Not a likely route of exposure. If inhaled, remove to fresh air. If not breathing give artificial respiration, preferably by mouth-to-mouth. If breathing is difficult, give oxygen. Seek prompt medical attention. Avoid when possible.
Eye and skin contact	Not a likely route of exposure. Flush eyes with water. Wash skin with soap and water.
Ingestion	Not a likely route of exposure. If ingested, dilute by giving two glasses of water and induce vomiting. Avoid when possible.
Injury from detonation	Seek prompt medical attention.

SPILL OR LEAK PROCEDURES	
Spill/leak response	Use appropriate personal protective equipment. Isolate area and remove sources of friction, impact, heat, low level electrical current, electrostatic or RF energy. Only competent, experienced persons should be involved in clean up procedures. Carefully pick up spills with non-sparking and non-static producing tools.
Waste disposal	Desensitize by diluting in water. Open train burning, by qualified personnel, may be used for disposal of small unconfined quantities. Dispose of in compliance with Federal Regulations under the authority of the Resource Conservation and Recovery Act (40 CFR Parts 260-271).

SPECIAL PROTECTION INFORMATION	
Ventilation	Use only with adequate ventilation. (If required)
Respiratory	None
Eye	None
Gloves	Impervious rubber gloves. (If required)
Other	Metal-free and/non-static producing clothes

SPECIAL PRECAUTIONS
• Keep away from friction, impact, and heat and open flame. Do not consume food, drink, or tobacco in areas where they may become contaminated with these materials. • Contaminated equipment must be thoroughly water cleaned before attempting repairs. • Use only non-spark producing tools. • No smoking.

STORAGE CONDITIONS
Store in a cool, dry place in accordance with the requirements of Subpart K, ATF: Explosives Law and Regulations (27 CFR 55.201-55.219).

SHIPPING INFORMATION		
Proper shipping name	Black Powder	
Hazard class	1.1D	
UN Number	UN0027	
DOT Label & Placard	DOT Label	EXPLOSIVES 1.1D
	DOT Placard	EXPLOSIVES 1.1
Alternate shipping	Limited quantities of GOEX black powder (1# cans only) may be transported as "Black powder for small arms – flammable solid" pursuant to U.S. Department of Transportation 49 CFR.	

The information contained in this Material Safety Data Sheet is based upon available data and believed to be correct; however, as such has been obtained from various sources, including the manufacturer, military and independent laboratories, it is given without warranty or representation that it is complete, accurate, and can be relied upon. GOEX, Incorporated, has not attempted to conceal in any manner the deleterious aspects of the product listed herein, but makes no warranty as to such. Further, GOEX, Incorporated, cannot anticipate nor control the many situations in which the product or this information may be used; there is no guarantee that the health and safety precautions suggested will be proper under all conditions. It is the sole responsibility of each user of the product to determine and comply with the requirements of all applicable laws and regulations regarding its use. This information is given solely for the purposes of safety to persons and property. Any other use of this information is expressly prohibited.

For further information contact: GOEX Powder, Incorporated
P. O. Box 659
Doyline, LA 71023-0659
Telephone Number: (318) 382-9300
Fax Number: (318) 382-9303

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BLACK POWDER

FRICTION TEST
PA

Steel – Snaps
Fiber – Unaffected

IMPACT TEST
PA

16 Inches (10% Point)

ELECTROSTATIC DISCHARGE TEST

Bureau of Mines
0.8 Joules (Confined)
12.5 Joules Unconfined)

STABILITY

75° C International Heat Test – 0.31% Loss
Vacuum Stability – 0. 5cc @ 100° C

BRISANCE – Sand Test 8 gm.

VELOCITY

In the open, trains of black powder burn very slowly, measurable in seconds per foot. Confined, as in steel pipe, speeds of explosions have been timed at values from 560 feet per second for very coarse granulations to 2,070 feet per second for the finer granulations. Confinement and granulation will affect the values.

CHEMICAL DECOMPOSITION

Use water to dissolve the potassium nitrate. By leeching out the potassium nitrate, the residue of sulfur and charcoal is non-explosive but combustible when dry – dispose separately.

SPECIAL REQUIREMENTS:

Black Powder is very sensitive to flame and spark and can also be ignited by friction and impact. When ignited unconfined, it burns with explosive violence and will explode if ignited under even slight confinement.

When dry, it is compatible with most metals. However, it is hydroscopic and when wet, attacks all common metals except stainless steel.

CAUTION: Explosives must be tested for compatibility with any material not specified in the production/procurement package with which they may come in contact. Materials include other explosives, solvents, adhesives, metals, plastics, paints, cleaning compounds, floor and table coverings, packing materials and other similar materials, situations and equipment. Explosives include propellants and pyrotechnics.

5

Carbon Fiber

HEXCEL

Material Safety Data Sheet

Section 1: PRODUCT AND COMPANY IDENTIFICATION

MSDS Identification: Carbon Fabric, Sized or Unsized
MSDS Number: 439-3227-00SU-C000-12 **Date:** October 1, 2002 **Page:** 1 of 6
Supersedes MSDS: 439-3227-00SU-C000-11

Manufacturer:
Hexcel Schwebel
2200 South Murray Avenue
P.O. Box 2627
Anderson, SC 29621

Emergency Telephone Number:
800-433-5072 (24-Hour)

Information Telephone Number:
864-260-5799 (Normal Business Hours-ET)

Product Identification: Carbon Fabric: Sized or Unsized

Chemical Family: Woven Carbon Fabric with various types of Sized and Unsized Carbon Fibers.

Section 2: COMPOSITION/INFORMATION ON INGREDIENTS

Component	CAS® Number	% by Weight	OSHA(PEL)	ACGIH®(TLV®)
Carbon fiber, synthetic	7440-44-0	98.5-100	15 mg/m^3(Total) 5 mg/m^3(Respirable)	10 mg/m^3(Total) 3 mg/m^3(Respirable)

This product is not classified as a Hazardous Chemical as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

Where specific exposure limits for component dusts are not established, the levels provided for (Total/Inhalable) dust and (Respirable) fraction reflect the classification of Particulates Not Otherwise Regulated (PNOR) by OSHA or Specified (PNOS) by ACGIH®.

Section 3: HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW:
Appearance and Odor:
Black fibers woven into fabrics of varying weight, width and thickness, depending on the style, with and without sizing, with no distinctive odor.

Statement of Hazard:
Warning! May cause temporary mechanical irritation of the eyes, skin or upper respiratory tract.

If sized, vapor or fumes generated from heating or curing this product may cause eye and respiratory tract irritation.

Carbon fibers or dust are electrically conductive and may create electrical short-circuits which could result in damage to and malfunction of electrical equipment and/or personal injury.

Section 3: HAZARDS IDENTIFICATION (Continued)

EMERGENCY OVERVIEW (continued):
Primary Routes of Exposure:
Eye--Yes Skin--Yes Inhalation--Yes Ingestion--No

HMIS® Rating:
Health--1 Flammability--0 Reactivity--0 Special--None

Potential Health Effects:
Eye: Contact may cause mechanical irritation to the eyes. If sized, vapor or fumes from exposure of this product to elevated temperatures may cause irritation to the eyes. Dust from machining, grinding or sawing the cured product may cause mechanical irritation.

Skin: Contact may cause mechanical irritation to the skin and possible dermatitis. Dust from machining, grinding or sawing the cured product may cause mechanical irritation.

Inhalation: May cause mechanical irritation to the upper respiratory tract. If sized, vapor or fumes from exposure of this product to elevated temperatures may cause irritation to the respiratory tract. Dust from machining, grinding or sawing the cured product may cause mechanical irritation.

Ingestion: Ingestion unlikely under normal conditions of use. If any of this product or the cured product dust is swallowed, seek medical attention immediately.

Medical Conditions Aggravated by Exposure: Preexisting eye, skin or respiratory disorders may be aggravated by exposure to this product or to the dust from machining, grinding or sawing the cured product.

Carcinogenic Information: None of the components present in this material at concentrations equal to or greater than 0.1 % are listed or regulated by IARC, NTP, OSHA or ACGIH® as a carcinogen.

Other:	**OSHA(PEL)**	**ACGIH®(TLV®)**
Exposure limits for cured product dust as [Particulates Not Otherwise Regulated (PNOR) by OSHA or Specified (PNOS) by ACGIH®]:	15 mg/m^3(Total) 5 mg/m^3(Respirable)	10 mg/m^3(Inhalable) 3 mg/m^3(Respirable)

Section 4: FIRST AID MEASURES

Eye: In case of eye contact, immediately flush eyes with large amounts of water for at least 15 minutes, keeping the eyelids open. Get medical attention immediately.

Skin: In case of contact that causes irritation, immediately wash skin with soap and room temperature to cool running water. Use a washcloth to help remove the fibers. To avoid further irritation, do not rub or scratch irritated areas. Rubbing or scratching may force fibers into the skin. Get medical attention immediately, if the irritation persists.

Inhalation: If large amounts of dust, fiber, fumes or vapor are inhaled, remove to fresh air. If not breathing, give artificial respiration, preferably mouth-to-mouth. If breathing is difficult, qualified personnel may administer oxygen. Get medical attention immediately.

Section 4: FIRST AID MEASURES (Continued)

Ingestion: Ingestion of this product or the dust from it is unlikely. If swallowed, get medical attention immediately.

Section 5: FIRE FIGHTING MEASURES

Flash Point/Method of Determination: Not determined

Means of Extinction: Use water spray, dry chemical or CO_2 to extinguish fires.

Special Fire Hazards: Avoid exposure through use of a self-contained, positive-pressure breathing apparatus.

Section 6: ACCIDENTAL RELEASE MEASURES

Procedures in case of Accidental Release or Leakage: Avoid contact with skin, eyes or clothing (See Section 8). Clean up material, put into a suitable container and dispose of properly (See Section 13).

Section 7: HANDLING AND STORAGE

Precautions to be taken in Handling and Storage: Store in a cool, dry place. Maintain sealed against contamination from dirt and moisture.

Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

Eye/Face Protection: Avoid eye contact. Wear safety glasses with side shields, as necessary, when using this product or when machining, grinding or sawing the cured product.

Skin Protection: Protective clothing such as a loose fitting long sleeved shirt that covers to the base of the neck, long pants and gloves, as necessary to prevent irritation. Skin irritation is known to occur primarily at pressure points such as around the neck, wrist, waist and between the fingers.

Respiratory Protection: Not ordinarily required. If sized and sufficient vapor or fumes are being generated during heating or curing of this product, use a NIOSH approved organic vapor respirator. If sufficient dust or fibers are generated during use or when machining, grinding or sawing the cured product, use a NIOSH approved dust respirator.

Ventilation: Use local exhaust sufficient to control vapor, fumes, fibers or dust generated. If exhaust ventilation is not available or is inadequate, use a NIOSH approved respirator, as appropriate.

General Hygiene Recommendations: Before eating, drinking, smoking or using toilet facilities, wash face and hands thoroughly with soap and water. Remove any contaminated clothing and launder before reuse. Use vacuum equipment to remove fibers and dust from clothing and work areas. Compressed air is not recommended.

Section 9: PHYSICAL AND CHEMICAL PROPERTIES

Appearance and Odor...Black fibers woven into fabrics of varying weight, width and thickness, depending on the style, with and without sizing, with no distinctive odor.
Melting Point (°F/°C)..... 6512°F/3600°C
Specific Gravity (Water=1)..... 1.5-1.9
pH of Undiluted Product.....Not determined
Volatile [Percent (%) by Weight].....0
Percent (%) VOC..... Not determined
Solubility in Water.....Negligible

Section 10: STABILITY AND REACTIVITY

Stability: Stable under proper handling and storage conditions

Incompatible Materials: None

Products evolved from Heat of Combustion or Decomposition: The products of combustion and decomposition depend on other materials present in the fire and the actual conditions of the fire. Burning will decompose the sizing system, if appropriate, and produce carbon and nitrogen oxides, phenols, aldehydes, acrolein, carboxylic acid, traces of incompletely burned carbon products and other unidentified gases and vapors that may be toxic. Avoid inhalation.

Hazardous Polymerization: Will not occur under proper conditions of use. Rapid heating of the product in bulk may produce an uncontrolled exothermic reaction that may char and decompose the sizing system, if appropriate, generating unidentified gases and vapors that may be toxic. Avoid inhalation.

Section 11: TOXICOLOGICAL INFORMATION

Component Toxicity Data:
Median Lethal Dose (Species):
Oral (LD_{50})...Not determined
Inhalation (LC_{50})...Not determined
Dermal (LD_{50})...Not determined

Irritation Index, Estimation of Irritation (Species):
Skin...Not determined
Eyes...Not determined
Inhalation...Not determined

Section 12: ECOLOGICAL INFORMATION

No ecological data has been determined.

Section 13: DISPOSAL CONSIDERATIONS

Waste Disposal Methods: Material for disposal should be placed in appropriate sealed containers to avoid potential human and environmental exposure. It is the responsibility of the generator to comply with all federal, state, provincial and local laws and regulations. We recommend that you contact an appropriate waste disposal contractor and environmental agency for relevant laws and regulations. Under the U.S., Resource Conservation and Recovery Act (RCRA), it is the responsibility of the user of the product to determine at the time of disposal, whether the product meets relevant waste classification.

Section 14: TRANSPORT INFORMATION

DOT:
Proper Shipping Name.... Not regulated
Hazard Class..... Not regulated
Identification Number..... Not regulated
Packing Group..... Not regulated
Label Required.....None

Section 15: REGULATORY INFORMATION

SARA Title III:
Section 302/304 Extremely Hazardous Substance:
None

Section 311 Hazardous Categorization:
None

Section 313 Toxic Chemicals:
None

CERCLA Section 102(a) Hazardous Substance:
None

RCRA Information:
Currently, the product is not listed in federal hazardous waste regulations 40 CFR, Part 261.33, paragraphs (e) or (f), i.e. chemical products that are considered hazardous if they become wastes. State or local hazardous waste regulations may also apply if they are different from the federal regulation. It is the responsibility of the user of the product to determine at the time of disposal, whether the product meets relevant waste classification and to assure proper disposal.

WHMIS (Canada):
Classification:
None

This product has been classified in accordance with hazard criteria of the "Controlled Products Regulations" and this MSDS contains all the information required by the "Controlled Products Regulations."

Ingredient Disclosure List:
None

Section 15: REGULATORY INFORMATION (Continued)

California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65): Warning! The state of California has determined that the following listed component chemicals in this product may cause cancer, birth defects or other reproductive harm:
None

U.S., EPA, TSCA Information: This product is an article as defined by TSCA and is not required to be listed in the TSCA inventory.

Ozone Depletion Information: This product does not contain or is not manufactured with ozone depleting substances as identified in Title VI, Clean Air Act "Stratospheric Ozone Protection" and the regulations set forth in 40 CFR, Part 82.

Section 16: OTHER INFORMATION

Special Precautions: Airborne carbon fibers or dust are electrically conductive and may create electrical short-circuits that could result in damage to and malfunction of electrical equipment and/or personal injury.

Explanation and Disclaimer: Wherever such words or phrases as "hazardous," "toxic," "carcinogen," etc. appear herein, they are used as defined or described under state employee right-to-know laws, Federal OSHA laws or the direct sources for these laws such as the International Agency for Research on Cancer (IARC), the National Toxicology Program (NTP), etc. The use of such words or phrases should not be taken to mean that we deem or imply any substance or exposure to be toxic, hazardous or otherwise harmful. **Any exposure can only be understood within the entire context of its occurrence, which includes such factors as the substance's characteristics as defined in the MSDS, amount and duration of exposures, other chemicals present and preexisting individual differences in response to the exposure.**

The data provided in this MSDS is based on the information received from our raw material suppliers and other sources believed to be reliable. We are supplying you this data solely in compliance with the Federal OSHA Hazard Communication Standard, 29 CFR 1910.1200 and other Federal and state laws as described in Section 15: Regulatory Information.

The information contained in this MSDS is proprietary and confidential to Hexcel Corporation. This MSDS and the information in it are not to be used for purposes other than compliance with the Federal OSHA Hazard Communication Standard. If you have received this MSDS from any source other than Hexcel Corporation or its authorized agent, the information contained in it may have been modified from the original document and it may not be the most current revision.

Liability, if any, for use of this product is limited to the terms contained in our sale terms and conditions. We do not in any way warrant (expressed or implied, including any implied warranty for merchantability or fitness for a particular purpose) the data contained or the product described in this MSDS. Additionally, we do not warrant that the product will not infringe any patent or other proprietary or property rights of others.

Contact: David M. Rubin,
Hexcel Schwebel Environmental, Health and Safety Manager

Cellulose Fiber (Dog Barf Wadding)

American Wood Fibers

Material Safety Data Sheet
Cellulose Fiber

American Wood Fibers
9841 Broken Land Parkway #302
Columbia, MD 21046

Additional Information: (410) 290-8700

1. Product Identification

Product	
Cellulose Fiber	

2. Hazardous Ingredients/Identity Information

Name	CAS#	Percent	Agency	Exposure Limits	Comments
Pulp (cellulose)	65996-61-4	20-95	OSHA OSHA ACGIH	PEL-TWA 15 mg/m3 PEL-TWA 5 mg/m3 TLV-TWA 10 mg/m3	Total dust Respirable dust Total dust
Calcium Carbonate (lime mud)	471-34-1	< 1%	OSHA ACGIH	PEL 15 mg/M3 PEL 5 mg/M3 TLV-TWA 10 mg/M3	Total dust Respirable dust Total dust
Water	Not applicable	5–20%	OSHA ACGIH	Not applicable	None

3. Hazard Identification

Appearance and Odor: Gray color, slight odor.
Primary Health Hazards: The primary health hazard posed by this product is thought to be due to exposure to dust.
Primary Route(s) of Exposure:
( ) Ingestion:
( ) Skin:
(X) Inhalation: Dust
(X) Eye
Medical Conditions Generally Aggravated by Exposure:
Chronic Health Hazards: Pulp (cellulose) dust is a biologically inert dust that has little or no effect on the lungs and does not produce significant organic disease or toxic effect when allowable exposure limits are met.
Carcinogenicity Listing:
( ) NTP: Not listed
( ) IARC Monographs: Not listed
( ) OSHA Regulated: Not listed

4. Emergency and First-Aid Procedures

Ingestion: Not applicable for product in purchased form.
Eye Contact: Dust may mechanically irritate the eyes, resulting in redness or watering. Treat dust in eye as foreign object. Flush with water to remove dust particles. Get medical help if irritation persists.
Skin Contact: Physical form of the product could be mechanically irritating to the skin.
Skin Absorption: Physical for of the product could be mechanically irritating to the skin.
Inhalation: Physical form of the product could be mechanically irritating to the skin.
Note to Physician: None

5. Fire and Explosion Data

Flash Point (Method Used): NA
Flammable Limits:
LEL: NA
UEL: NA
Extinguishing Media: Water.
Autoignition Temperature: 500° F depending on moisture content.
Special Firefighting Procedures: None.
Unusual Fire and Explosion Hazards: Depending on moisture content, particle diameter, and rate of heating, cellulose dust may explode in the presence of an ignition source. An airborne concentration of 30,000 mg/m^3 is often used as the LEL for cellulose.
NFPA Rating (Scale 0-4): Health = 1 Fire = 1 Reactivity = 0

6. Accidental Release Measures

Steps to be Taken In Case Material Is Released or Spilled: Normal clean up for pulp cellulose solids or dust. Sweep or vacuum for recovery or disposal.

7. Handling and Storage

Precautions to be Taken In Handling and Storage: No special handling precautions are required. Keep in cool, dry place away from sources of ignition.

8. Exposure Control Measures, Personal Protection

Personal Protective Equipment: Chemical resistant gloves not required. However, cloth, canvas, or leather gloves are recommended to minimize potential mechanical irritation from handling product.
Respiratory Protection: Not normally required. NIOSH/MSHA approved respirator when allowable exposure may be exceeded.
Work/Hygiene Practices: Avoid skin contact. Wash hands with soap and water and practice good personal hygiene.
Ventilation: Mechanical Ventilation (general dilution) - Provide general ventilation in processing and storage. Provide local exhaust if necessary to reduce dust levels below acceptable exposure limits.

9. Physical/Chemical Properties

Physical Description: Solid, gray moist material

Boiling Point (@ 760 mm Hg):	Not applicable
Evaporation Rate (Butyl acetate = 1):	Not applicable
Freezing Point:	32 degrees F
Melting Point:	Not applicable
Molecular Formula:	Not applicable
Molecular Weight:	Not applicable
Oil-water distribution coefficient:	Not tested
Odor threshold:	Not applicable
pH:	5 to 10
Solubility in Water (% by weight):	Insoluble
Specific Gravity (H_2O = 1):	Not applicable
Vapor Density (air = 1; 1 atm):	Not applicable
Vapor Pressure (mm Hg):	Not applicable
Viscosity:	Not applicable
% Volatile by Volume [@ 70°F (21°C)]:	Not applicable

10. Stability and Reactivity

Stability: ☐ Unstable ☒ Stable
Conditions to Avoid: Open flame, sparks, or other sources of ignition.
Incompatibility (Materials to Avoid): Strong acids, strong oxidizers
Hazardous Decomposition or By-Products: In a fire situation carbon dioxide and carbon monoxide. Anaerobic decomposition may produce hydrogen sulfide and other malodorous compounds.
Hazardous Polymerization: ☐ May occur ☒ Will not occur
Sensitivity to Mechanical Impact: Not applicable
Sensitivity to Static Discharge: Not applicable

11. Toxicological Information

Toxicity Data: No information for product in purchased form.
Cellulose LC50 (rates, inhalation) 5,800 mg/m^3 4-hours
Target Organs: Eyes and skin

12. Ecological Information

Environmental Fate: No information available at this time
Environmental Toxicity No information available at this time

13. Disposal Considerations

Waste Disposal Method: Deposit in landfill or incinerate according to federal, state and local regulations.

14. Transport Information

Not regulated as a hazardous material by US-DOT.

15. Regulatory Information

TSCA: All ingredients are on the TSCA inventory
STATE RIGHT-TO-KNOW:
California Prop 65 – This product does not contain any substances listed under California Prop. 65.
New Jersey - This product does not contain any substances listed by the state of New Jersey
Pennsylvania – Cellulose is listed by the state of Pennsylvania
SARA 313 Information: To the best of our knowledge, this product contains no chemical subject to SARA Title II Section 313 supplier notification requirements.
FDA: Not applicable
WHMIS Classification: Not classified

16. Additional Information

Date Prepared: November 25, 2003
Date Revised: NAP
Prepared By: Corporate Environment, Health & Safety
User's Responsibility: The information contained in this Material Safety Data Sheet is based on the experience of occupational health and safety professionals and comes from sources believed to be accurate or otherwise technically correct. It is the user's responsibility to determine if this information is suitable for their applications and to follow safety precautions as may be necessary. The user has the responsibility to make sure that this sheet is the most up-to-date issue.

Definition of Common Terms:

ACGIH	=	American Conference of Governmental Industrial Hygienists
C	=	Ceiling Limit
CAS#	=	Chemical Abstracts System Number
DOT	=	U. S. Department of Transportation
DSL	=	Domestic Substance List
EPA	=	U.S. Environmental Protection Agency
IARC	=	International Agency for Research on Cancer
IATC	=	International Air Transport Association
IMDG	=	International Maritime Dangerous Goods
LCLo	=	Lowest concentration in air resulting in death
LC50	=	Concentration in air resulting in death to 50% of experimental animals
LDLo	=	Lowest dose resulting in death
LD50	=	Administered dose resulting in death to 50% of experimental animals
LEL	=	Lower Explosive Limit
LFL	=	Lower Flammable Limit
MSHA	=	Mining Safety and Health Administration
NAP	=	Not Applicable
NAV	=	Not Available
NIOSH	=	National Institute for Occupational Safety and Health
NPRI	=	Cadadian National Pollution Release Inventory
NTP	=	National Toxicology Program
OSHA	=	Occupational Safety and Health Administration
PEL	=	Permissible Exposure Limit
RCRA	=	Resource Conservation and Recovery Act
STEL	=	Short-Term Exposure Limit (15 minutes)
TCLo	=	Lowest concentration in air resulting in a toxic effect
TDG	=	Canadian Transportation of Dangerous Goods
TDLo	=	Lowest dose resulting in a toxic effect
TLV	=	Threshold Limit Value
TSCA	=	Toxic Substance Control Act
TWA	=	Time-Weighted Average (8 hours)
UFL	=	Upper Flammable Limit
WHMIS	=	Workplace Hazardous Materials Information System

Duct Tape

Material Safety Data Sheet

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This material safety data sheet (MSDS) is provided as a courtesy in response to a customer request. This product is not regulated under, and a MSDS is not required for this product by the OSHA Hazard Communication Standard (29 CFR 1910.1200) because, when used as recommended or under ordinary conditions, it should not present a health and safety hazard. However, use or processing of the product not in accordance with the product's recommendations or not under ordinary conditions may affect the performance of the product and may present potential health and safety hazards.

SECTION 1: PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: 3M™ Tapes: 3900, 3939, 6969, 2929, 5959, 8979, 8979N, and 390
MANUFACTURER: 3M
DIVISION: Industrial Adhesives and Tapes Division

ADDRESS: 3M Center, St. Paul, MN 55144-1000

EMERGENCY PHONE: 1-800-364-3577 or (651) 737-6501 (24 hours)

Issue Date: 06/19/13
Supercedes Date: 09/07/10

Document Group: 26-2650-5

Product Use:
Specific Use: Bundling, Reinforcing, & Sealing
Intended Use: Industrial use

3M™ Multi-Purpose Duct Tape 3900
3M™ Heavy Duty Duct Tape 3939
3M™ Extra Heavy Duty Duct Tape 6969
3M™ General Use Duct Tape 2929
3M™ Outdoor Masking and Stucco Tape 5959
3M™ Performance Plus Duct Tape 8979 & 8979N
Scotch® Polyethylene Coated Cloth Tape 390

SECTION 2: INGREDIENTS

Ingredient	C.A.S. No.	% by Wt
Polyethylene Film over Cloth Scrim Backing	None	51 - 99
Rubber Adhesive	Trade Secret	1 - 49

SECTION 3: HAZARDS IDENTIFICATION

3.1 EMERGENCY OVERVIEW

Odor, Color, Grade: various colored duct tape
General Physical Form: Solid
Immediate health, physical, and environmental hazards: The environmental properties of this product present a low environmental hazard. This product, when used under reasonable conditions and in accordance with the 3M directions for use, should not present a health hazard. However, use or processing of the product in a manner not in accordance with the product's directions for use may affect the performance of the product and may present potential health and safety hazards.

3.2 POTENTIAL HEALTH EFFECTS

Eye Contact:
No health effects are expected.

Skin Contact:
No health effects are expected.

Inhalation:
No health effects are expected.

Ingestion:
No health effects are expected.

3.3 POTENTIAL ENVIRONMENTAL EFFECTS

This substance does not leach metals or other RCRA (Resource Conservation and Recovery Act) listed TCLP (Toxic Characteristic Leaching Procedure) hazardous substances at concentrations that would make the product a hazardous waste.

SECTION 4: FIRST AID MEASURES

4.1 FIRST AID PROCEDURES

The following first aid recommendations are based on an assumption that appropriate personal and industrial hygiene practices are followed.

Eye Contact: No need for first aid is anticipated.
Skin Contact: No need for first aid is anticipated.
Inhalation: No need for first aid is anticipated.
If Swallowed: No need for first aid is anticipated.

SECTION 5: FIRE FIGHTING MEASURES

5.1 FLAMMABLE PROPERTIES

Autoignition temperature	*Not Applicable*
Flash Point	*Not Applicable*
Flammable Limits(LEL)	*Not Applicable*
Flammable Limits(UEL)	*Not Applicable*

5.2 EXTINGUISHING MEDIA
Use fire extinguishers with class B extinguishing agents (e.g., dry chemical, carbon dioxide).

5.3 PROTECTION OF FIRE FIGHTERS

Special Fire Fighting Procedures: Wear full protective equipment (Bunker Gear) and a self-contained breathing apparatus (SCBA).

Unusual Fire and Explosion Hazards: No unusual fire or explosion hazards are anticipated.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1. Personal precautions, protective equipment and emergency procedures
Not applicable.

6.2. Environmental precautions
Not applicable.

Clean-up methods
Not applicable.

SECTION 7: HANDLING AND STORAGE

7.1 HANDLING
This product is considered to be an article which does not release or otherwise result in exposure to a hazardous chemical under normal use conditions.

7.2 STORAGE
Not applicable.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 ENGINEERING CONTROLS
Not applicable.

8.2 PERSONAL PROTECTIVE EQUIPMENT (PPE)

8.2.1 Eye/Face Protection
Avoid eye contact.

8.2.2 Skin Protection
Avoid prolonged or repeated skin contact.

8.2.3 Respiratory Protection
Under normal use conditions, airborne exposures are not expected to be significant enough to require respiratory protection.

8.2.4 Prevention of Swallowing
Not applicable.

8.3 EXPOSURE GUIDELINES

None Established

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Odor, Color, Grade:	various colored duct tape
General Physical Form:	Solid
Autoignition temperature	*Not Applicable*
Flash Point	*Not Applicable*
Flammable Limits(LEL)	*Not Applicable*
Flammable Limits(UEL)	*Not Applicable*
Boiling Point	*Not Applicable*
Density	*Not Applicable*
Vapor Density	*Not Applicable*
Vapor Pressure	*Not Applicable*
Specific Gravity	*Not Applicable*
pH	*Not Applicable*
Melting point	*Not Applicable*
Solubility in Water	Nil
Evaporation rate	*Not Applicable*
Volatile Organic Compounds	*Not Applicable*
Kow - Oct/Water partition coef	*Not Applicable*
Percent volatile	*Not Applicable*
VOC Less H2O & Exempt Solvents	*Not Applicable*
Viscosity	*Not Applicable*

SECTION 10: STABILITY AND REACTIVITY

Stability: Stable.

Materials and Conditions to Avoid:
10.1 Conditions to avoid
None known

10.2 Materials to avoid
None known

Hazardous Polymerization: Hazardous polymerization will not occur.

Hazardous Decomposition: Under recommended usage conditions, hazardous decomposition products are not expected. Hazardous decomposition products may occur as a result of oxidation, heating, or reaction with another material.

SECTION 11: TOXICOLOGICAL INFORMATION

Please contact the address listed on the first page of the MSDS for Toxicological Information on this material and/or its components.

SECTION 12: ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL INFORMATION

Not determined.

CHEMICAL FATE INFORMATION

Not determined.

SECTION 13: DISPOSAL CONSIDERATIONS

Waste Disposal Method: Reclaim if feasible. If product can't be reclaimed, dispose of waste product in a sanitary landfill. Alternatively, incinerate the waste product in an industrial, commercial, or municipal incinerator.

Since regulations vary, consult applicable regulations or authorities before disposal.

SECTION 14:TRANSPORT INFORMATION

Not regulated per U.S. DOT, IATA or IMO.

These transportation classifications are provided as a customer service. As the shipper YOU remain responsible for complying with all applicable laws and regulations, including proper transportation classification and packaging. *3M transportation classifications are based on product formulation, packaging, 3M policies and 3M understanding of applicable current regulations. 3M does not guarantee the accuracy of this classification information. This information applies only to transportation classification and* ***not*** ***the packaging, labeling, or marking requirements.*** *The original 3M package is certified for U.S. ground shipment only. If you are shipping by air or ocean, the package may not meet applicable regulatory requirements.*

SECTION 15: REGULATORY INFORMATION

US FEDERAL REGULATIONS

Contact 3M for more information.

311/312 Hazard Categories:
Fire Hazard - No Pressure Hazard - No Reactivity Hazard - No Immediate Hazard - No Delayed Hazard - No

STATE REGULATIONS

Contact 3M for more information.

CHEMICAL INVENTORIES

This product is an article as defined by TSCA regulations, and is exempt from TSCA Inventory listing requirements.

Contact 3M for more information.

INTERNATIONAL REGULATIONS

Contact 3M for more information.

This MSDS has been prepared to meet the U.S. OSHA Hazard Communication Standard, 29 CFR 1910.1200.

SECTION 16: OTHER INFORMATION

NFPA Hazard Classification

Health: 0 **Flammability:** 1 **Reactivity:** 0 **Special Hazards:** None

National Fire Protection Association (NFPA) hazard ratings are designed for use by emergency response personnel to address the hazards that are presented by short-term, acute exposure to a material under conditions of fire, spill, or similar emergencies. Hazard ratings are primarily based on the inherent physical and toxic properties of the material but also include the toxic properties of combustion or decomposition products that are known to be generated in significant quantities.

Revision Changes:
Section 1: Product name was modified.
Section 1: Product use information was modified.
Section 16: Disclaimer (second paragraph) was modified.
Section 14: Transportation legal text was modified.
Page Heading: Product name was modified.
Section 9: Density information was modified.
Section 9: Vapor density value was modified.
Section 9: Vapor pressure value was modified.
Section 9: Boiling point information was modified.
Section 5: Flammable limits (UE) information was modified.
Section 5: Flammable limits (LEL) information was modified.
Section 5: Autoignition temperature information was modified.
Section 5: Flash point information was modified.
Section 9: Property description for optional properties was modified.
Section 9: Specific gravity information was modified.
Section 9: pH information was modified.
Section 9: Melting point information was modified.
Section 9: Solubility in water text was modified.
Section 9: Flash point information was modified.
Section 9: Flammable limits (LEL) information was modified.
Section 9: Flammable limits (UEL) information was modified.
Section 9: Autoignition temperature information was modified.
Section 2: Ingredient table was modified.
Section 6: 6.2. Environmental precautions heading was modified.
Section 6: 6.1. Personal precautions, protective equipment and emergency procedures heading was modified.
Section 2: Product identification comment was added.
Section 16: Web address was added.
Section 1: Address was added.
Copyright was added.
Company logo was added.
Telephone header was added.
Company Telephone was added.
Section 1: Emergency phone information was added.
Section 1: Emergency phone information was deleted.
Company Logo was deleted.
Copyright was deleted.

Section 16: Web address heading was deleted.
Section 1: Address line 1 was deleted.
Section 1: Address line 2 was deleted.

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3M USA MSDSs are available at www.3M.com

Electrical/Masking Tape

Material Safety Data Sheet

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This material safety data sheet (MSDS) is provided as a courtesy in response to a customer request. This product is not regulated under, and a MSDS is not required for this product by the OSHA Hazard Communication Standard (29 CFR 1910.1200) because, when used as recommended or under ordinary conditions, it should not present a health and safety hazard. However, use or processing of the product not in accordance with the product's recommendations or not under ordinary conditions may affect the performance of the product and may present potential health and safety hazards.

SECTION 1: PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: Scotch® Super 33+™ Vinyl Electrical Tape and Scotch® Premium Vinyl Electrical Tape Super 88
MANUFACTURER: 3M
DIVISION: Electrical Markets Division

ADDRESS: 3M Center, St. Paul, MN 55144-1000

EMERGENCY PHONE: 1-800-364-3577 or (651) 737-6501 (24 hours)

Issue Date: 08/04/11
Supercedes Date: 12/02/10

Document Group: 16-6314-5

Product Use:
Intended Use: Electrical

SECTION 2: INGREDIENTS

Ingredient	C.A.S. No.	% by Wt
PVC Film Backing	Mixed	75 - 85
Rubber adhesive	Trade Secret	10 - 20
ANTIMONY TRIOXIDE	1309-64-4	1 - 3
CARBON BLACK	1333-86-4	1 - 3
DI-C8-10-BRANCHED ALKYL PHTHALATE, C9 RICH	68515-48-0	1 - 3

SECTION 3: HAZARDS IDENTIFICATION

3.1 EMERGENCY OVERVIEW

Specific Physical Form: Roll of Tape
Odor, Color, Grade: Black adhesive tape, slight odor.
General Physical Form: Solid
Immediate health, physical, and environmental hazards: The environmental properties of this product present a low environmental hazard. Contains a chemical or chemicals which can cause cancer. This product, when used under reasonable conditions and in accordance with the 3M directions for use, should not present a health hazard. However, use or processing of the product in a manner not in accordance with the product's directions for use may affect the performance of the product and may present potential health and safety hazards.

3.2 POTENTIAL HEALTH EFFECTS

Eye Contact:
No health effects are expected.

Skin Contact:
No health effects are expected.

Inhalation:
No health effects are expected.

Ingestion:
No health effects are expected.

3.3 POTENTIAL ENVIRONMENTAL EFFECTS

This substance does not leach metals or other RCRA (Resource Conservation and Recovery Act) listed TCLP (Toxic Characteristic Leaching Procedure) hazardous substances at concentrations that would make the product a hazardous waste.

SECTION 4: FIRST AID MEASURES

4.1 FIRST AID PROCEDURES

The following first aid recommendations are based on an assumption that appropriate personal and industrial hygiene practices are followed.

Eye Contact: No need for first aid is anticipated.
Skin Contact: No need for first aid is anticipated.
Inhalation: No need for first aid is anticipated.
If Swallowed: No need for first aid is anticipated.

SECTION 5: FIRE FIGHTING MEASURES

5.1 FLAMMABLE PROPERTIES

Autoignition temperature	*No Data Available*
Flash Point	*Not Applicable*
Flammable Limits(LEL)	*No Data Available*
Flammable Limits(UEL)	*No Data Available*
OSHA Flammability Classification:	Not Applicable

5.2 EXTINGUISHING MEDIA

Use fire extinguishers with class B extinguishing agents (e.g., dry chemical, carbon dioxide).

5.3 PROTECTION OF FIRE FIGHTERS

Special Fire Fighting Procedures: Wear full protective equipment (Bunker Gear) and a self-contained breathing apparatus (SCBA).

Unusual Fire and Explosion Hazards: Not applicable. No unusual fire or explosion hazards are anticipated.

Note: See STABILITY AND REACTIVITY (SECTION 10) for hazardous combustion and thermal decomposition information.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1. Personal precautions, protective equipment and emergency procedures
Not applicable.

6.2. Environmental precautions
Not applicable.

Clean-up methods
Not applicable.

SECTION 7: HANDLING AND STORAGE

7.1 HANDLING
This product is considered to be an article which does not release or otherwise result in exposure to a hazardous chemical under normal use conditions. Avoid contact with oxidizing agents. Use general dilution ventilation and/or local exhaust ventilation to control airborne exposures to below Occupational Exposure Limits. If ventilation is not adequate, use respiratory protection equipment.

7.2 STORAGE
Store away from oxidizing agents.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 ENGINEERING CONTROLS
Not applicable.

8.2 PERSONAL PROTECTIVE EQUIPMENT (PPE)

8.2.1 Eye/Face Protection
Not applicable.

8.2.2 Skin Protection
Not applicable. Avoid skin contact. Select and use gloves and/or protective clothing to prevent skin contact based on the results of an exposure assessment. Consult with your glove and/or protective clothing manufacturer for selection of appropriate compatible materials.

8.2.3 Respiratory Protection

Under normal use conditions, airborne exposures are not expected to be significant enough to require respiratory protection.

8.2.4 Prevention of Swallowing
Not applicable.

8.3 EXPOSURE GUIDELINES

None Established

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Specific Physical Form:	Roll of Tape
Odor, Color, Grade:	Black adhesive tape, slight odor.
General Physical Form:	Solid
Autoignition temperature	*No Data Available*
Flash Point	*Not Applicable*
Flammable Limits(LEL)	*No Data Available*
Flammable Limits(UEL)	*No Data Available*
Boiling Point	*Not Applicable*
Density	1.22 g/cm3
Vapor Density	*Not Applicable*
Vapor Pressure	*Not Applicable*
Specific Gravity	1.22 [*Details:* Ref Std: Water = 1]
pH	*Not Applicable*
Melting point	*No Data Available*
Solubility in Water	Nil
Evaporation rate	*Not Applicable*
Volatile Organic Compounds	*No Data Available*
Kow - Oct/Water partition coef	*No Data Available*
Percent volatile	*Not Applicable*
VOC Less H2O & Exempt Solvents	*No Data Available*
Viscosity	*Not Applicable*

SECTION 10: STABILITY AND REACTIVITY

Stability: Stable.

Materials and Conditions to Avoid:
10.1 Conditions to avoid
None known

10.2 Materials to avoid
Strong oxidizing agents

Hazardous Polymerization: Hazardous polymerization will not occur.

Hazardous Decomposition or By-Products

Substance	Condition
Hydrocarbons	At Elevated Temperatures
Carbon monoxide	During Combustion
Carbon dioxide	During Combustion
Hydrogen Chloride	During Combustion
Irritant Vapors or Gases	During Combustion
Oxides of Antimony	During Combustion
Oxides of Zinc	During Combustion

Hazardous Decomposition: Under recommended usage conditions, hazardous decomposition products are not expected. Hazardous decomposition products may occur as a result of oxidation, heating, or reaction with another material.

SECTION 11: TOXICOLOGICAL INFORMATION

Please contact the address listed on the first page of the MSDS for Toxicological Information on this material and/or its components.

SECTION 12: ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL INFORMATION

Not applicable.

CHEMICAL FATE INFORMATION

Not applicable.

SECTION 13: DISPOSAL CONSIDERATIONS

Waste Disposal Method: Reclaim if feasible. If product can't be reclaimed, dispose of waste product in a sanitary landfill. Alternatively, incinerate the waste product in an industrial, commercial, or municipal incinerator.

EPA Hazardous Waste Number (RCRA): Not regulated

Since regulations vary, consult applicable regulations or authorities before disposal.

SECTION 14:TRANSPORT INFORMATION

ID Number(s):
80-6108-3383-4, 80-6112-6706-5, 80-6112-6707-3, 80-6114-3008-5, 80-6114-3009-3, 80-6114-5763-3

For Transport Information, please visit http://3M.com/Transportinfo or call 1-800-364-3577 or 651-737-6501.

SECTION 15: REGULATORY INFORMATION

US FEDERAL REGULATIONS

Contact 3M for more information.

311/312 Hazard Categories:
Fire Hazard - No Pressure Hazard - No Reactivity Hazard - No Immediate Hazard - No Delayed Hazard - No

STATE REGULATIONS
Contact 3M for more information.

CHEMICAL INVENTORIES
The components of this product are in compliance with the chemical notification requirements of TSCA.

This product is an article as defined by TSCA regulations, and is exempt from TSCA Inventory listing requirements.

Contact 3M for more information.

INTERNATIONAL REGULATIONS
Contact 3M for more information.

This MSDS has been prepared to meet the U.S. OSHA Hazard Communication Standard, 29 CFR 1910.1200.

SECTION 16: OTHER INFORMATION

NFPA Hazard Classification
Health: 0 **Flammability:** 1 **Reactivity:** 0 **Special Hazards:** None

National Fire Protection Association (NFPA) hazard ratings are designed for use by emergency response personnel to address the hazards that are presented by short-term, acute exposure to a material under conditions of fire, spill, or similar emergencies. Hazard ratings are primarily based on the inherent physical and toxic properties of the material but also include the toxic properties of combustion or decomposition products that are known to be generated in significant quantities.

HMIS Hazard Classification
Health: 0 **Flammability:** 1 **Reactivity:** 0 **Protection:** A

Hazardous Material Identification System (HMIS®) hazard ratings are designed to inform employees of chemical hazards in the workplace. These ratings are based on the inherent properties of the material under expected conditions of normal use and are not intended for use in emergency situations. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered mark of the National Paint and Coatings Association (NPCA).

Revision Changes:
Section 1: Product name was modified.
Section 16: Disclaimer (second paragraph) was modified.
Section 5: Unusual fire and explosion hazard information was modified.
Section 7: Handling information was modified.
Section 7: Storage information was modified.
Section 3: Immediate other hazard(s) was modified.
Page Heading: Product name was modified.
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Section 2: Ingredient table was modified.
Section 6: 6.2. Environmental precautions heading was modified.
Section 6: 6.1. Personal precautions, protective equipment and emergency procedures heading was modified.

Section 10: Materials to avoid physical property was modified.
Section 9: Density information was added.
Section 8: Exposure guidelines information - none - was added.
Section 16: Web address was added.
Section 1: Address was added.
Copyright was added.
Company logo was added.
Telephone header was added.
Company Telephone was added.
Section 1: Emergency phone information was added.
Section 1: Emergency phone information was deleted.
Company Logo was deleted.
Copyright was deleted.
Section 16: Web address heading was deleted.
Section 3: Immediate physical hazard(s) was deleted.
Section 15: California proposition 65 reproductive harm warning was deleted.
Section 1: Address line 1 was deleted.
Section 1: Address line 2 was deleted.
Section 15: EPCRA 313 information was deleted.
Section 15: EPCRA 313 text was deleted.
Section 8: Exposure guidelines ingredient information was deleted.
Section 8: Exposure guideline note was deleted.
Section 8: Exposure guidelines data source legend was deleted.
Section 3: Carcinogenicity table was deleted.
Section 3: Carcinogenicity heading was deleted.
Section 15: California proposition 65 ingredient information was deleted.
Section 15: California proposition 65 heading was deleted.
Section 15: California proposition 65 cancer warning was deleted.

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3M USA MSDSs are available at www.3M.com

Electric Matches

ELECTRIC MATCH 1.4S UN0454
MATERIAL SAFETY DATA SHEET **REVISION DATE: 01-01-07**

1. IDENTIFICATION

1.1 SUPPLIER

Company:	RockTek Limited
ABN:	30 079 287 657
Street Address:	1334 Stakehill Road BALDIVIS WESTERN AUSTRALIA 6171
Telephone:	+61 8 9523 1374
Facsimile:	+61 8 9523 1449

EMERGENCY TELEPHONE NUMBER: **mobile - 0417 990 206 (24hrs)**

1.2 PRODUCT DESIGNATION

PRODUCT NAME: Electric Match

UN Proper Shipping Name	Igniters
UN Number	0454
EX Number	9204264
Dangerous Goods Class	1.4S
Subsidiary Risk	None
Poisons Schedule Number	None

1.3 PERSONAL PROTECTIVE EQUIPMENT REQUIRED

This is the minimum personal protective equipment required during the use of QuikDraw® Product.

Site specific personal protective equipment requirements also need to be adhered to.

1.4 PHYSICAL PROPERTIES

Boiling Point (° C):	Not Applicable
Melting Point (° C):	Not Applicable
Vapor Pressure (kPa):	Not Applicable
Vapor Density:	Not Applicable
Specific Gravity:	Not Applicable
Solubility in Water:	Insoluble with lacquer coating intact
Reactivity in Water:	Not Applicable
Appearance and Odour	Medium brown coloured bead of pyrotechnic composition on a copper clad chip with two PVC insulated connecting wires of various lengths.

2. HEALTH HAZARD INFORMATION

2.1 HAZARDOUS INGREDIENT/IDENTITY

		Exposure Limits		
Chemical Name	**CAS #**	**OSHA (PEL)**	**ACGIH (TLV)**	**Other Limits %**
Lead Thiocyanate	582-87-0	TWA .05mg(Pb)/m3	.15mg (Pb)/m3 TWA	.10mg(Pb)fm3 NIOSH TWA
Lead Oxide (Tetra)	1314-41-5	TWA .02mg(Pb)/m3		.10mg(Pb)m3 NIOSH TWA
Potasium Chlorate	3811-04-09			ori rat LDLo:7.000mg/kg
Potassium Per chlorate	7778-74-7			ori rat LDLo:2.100mg/kg

3 SAFE HANDLING AND STORAGE

3.1 STORAGE REQUIREMENTS

- Store Electric Matches in original containers.
- Keep containers securely sealed until ready for use.
- Keep away from sources of heat and ignition, such as sparks or open flames.
- Store Electric Matches in a cool, dry, well-ventilated, secure store.
- Store in an area away from other materials.
- Regularly check storage container and packaging.

3.2 HANDLING REQUIREMENTS

- No smoking.
- Handle with caution.
- Protect Electric Matches from damp and electric/ electromagnetic environments.
- Avoid subjecting products or their packaging to mechanical shock and physical damage.
- Do not attempt to disassemble / modify the Electric Match.
- Testing and use of pyrotechnic items and materials may be carried out only with approved equipment and by qualified personnel (maximum intensity of current used for testing firing circuit resistance – 10mA).

3.3 PRECAUTIONS TO BE TAKEN IN THE EVENT OF AN INCIDENT

Explosive materials accidentally spilt from pyrotechnic items must be recovered for removal and destructive disposal.

Where such an incident has occurred:

- Avoid all mechanical shock
- Avoid all friction
- Eliminate all risk of production of sparks
- Keep away from all heat sources.
- Keep away from naked flames.
- Keep away from other pyrotechnic products since any manipulation of such material may cause an explosion.
- Where packed pyrotechnic packing is broken open, transfer all the contents to a wooden or cardboard container avoiding subjecting them to any mechanical shock, spark, heat or other source of risk.

3.4 FIRE/EXPLOSION HAZARD

- In the event of a fire, the product will release high levels of thermal emission.
- Clear area of personnel and move upwind.
- Do not use suffocation fire fighting method devices contain their own oxygen.
- Avoid all excessive heat as it may cause the igniter to initiate.

3.5 PRECAUTIONS TO BE TAKEN ON DISPOSAL

- Never dispose of these products in a dustbin/trash can or in a public disposal area.
- Destruction of pyrotechnic products by explosion or incineration must be carried out in an area specially designated for such disposal by physically protected personnel.
- Procedures, instructions and rules for the destructive disposal of pyrotechnic products and the associated means for physical protection of personnel must be determined on the basis of a technical safety study which must examine in particular the maximum load acceptable in terms of the disposal environment and the personnel to be protected from risk.
- Explosive materials must not be mixed with priming devices when the latter are being destroyed.

4. CONTACT POINTS

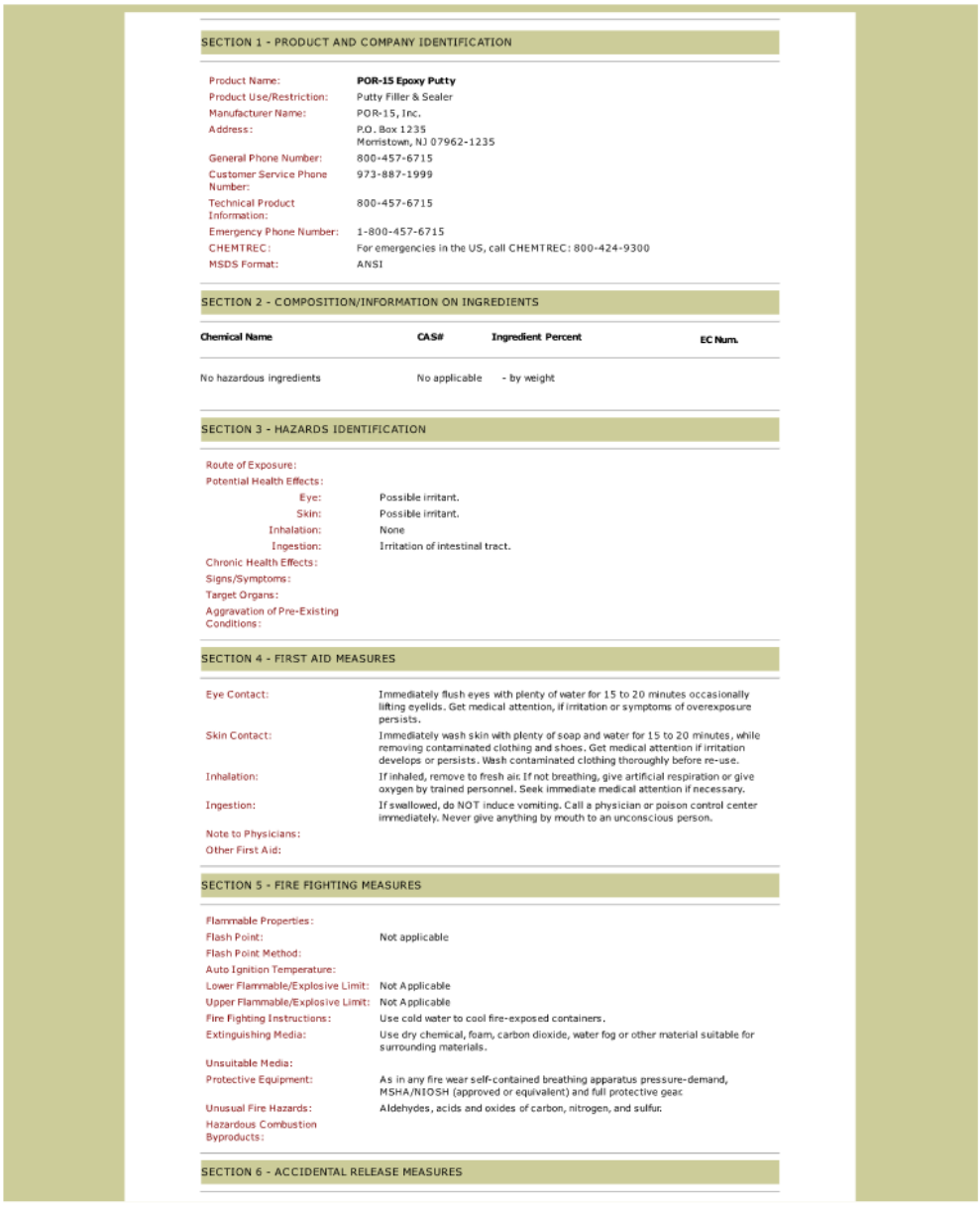
AUSTRALIAN POISONS INFORMATION CENTRE (24 hour service 13 11 26)

EMERGENCY CONTACT

Police	Dial "000" or 1100 Exchange
Fire Brigade	Notify Police and Fire Brigade as to location, material, quantity, UN Number and Company Contact.

COMPANY CONTACT Brandrill Limited, Occupational Health & Safety Department, Henderson, Western Australia, Telephone: +61 8 9494 6500

Epoxy Putty



SECTION 1 - PRODUCT AND COMPANY IDENTIFICATION

Product Name:	**POR-15 Epoxy Putty**
Product Use/Restriction:	Putty Filler & Sealer
Manufacturer Name:	POR-15, Inc.
Address:	P.O. Box 1235 Morristown, NJ 07962-1235
General Phone Number:	800-457-6715
Customer Service Phone Number:	973-887-1999
Technical Product Information:	800-457-6715
Emergency Phone Number:	1-800-457-6715
CHEMTREC:	For emergencies in the US, call CHEMTREC: 800-424-9300
MSDS Format:	ANSI

SECTION 2 - COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name	CAS#	Ingredient Percent	EC Num.
No hazardous ingredients	No applicable	- by weight	

SECTION 3 - HAZARDS IDENTIFICATION

Route of Exposure:	
Potential Health Effects:	
Eye:	Possible irritant.
Skin:	Possible irritant.
Inhalation:	None
Ingestion:	Irritation of intestinal tract.
Chronic Health Effects:	
Signs/Symptoms:	
Target Organs:	
Aggravation of Pre-Existing Conditions:	

SECTION 4 - FIRST AID MEASURES

Eye Contact:	Immediately flush eyes with plenty of water for 15 to 20 minutes occasionally lifting eyelids. Get medical attention, if irritation or symptoms of overexposure persists.
Skin Contact:	Immediately wash skin with plenty of soap and water for 15 to 20 minutes, while removing contaminated clothing and shoes. Get medical attention if irritation develops or persists. Wash contaminated clothing thoroughly before re-use.
Inhalation:	If inhaled, remove to fresh air. If not breathing, give artificial respiration or give oxygen by trained personnel. Seek immediate medical attention if necessary.
Ingestion:	If swallowed, do NOT induce vomiting. Call a physician or poison control center immediately. Never give anything by mouth to an unconscious person.
Note to Physicians:	
Other First Aid:	

SECTION 5 - FIRE FIGHTING MEASURES

Flammable Properties:	
Flash Point:	Not applicable
Flash Point Method:	
Auto Ignition Temperature:	
Lower Flammable/Explosive Limit:	Not Applicable
Upper Flammable/Explosive Limit:	Not Applicable
Fire Fighting Instructions:	Use cold water to cool fire-exposed containers.
Extinguishing Media:	Use dry chemical, foam, carbon dioxide, water fog or other material suitable for surrounding materials.
Unsuitable Media:	
Protective Equipment:	As in any fire wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.
Unusual Fire Hazards:	Aldehydes, acids and oxides of carbon, nitrogen, and sulfur.
Hazardous Combustion Byproducts:	

SECTION 6 - ACCIDENTAL RELEASE MEASURES

Personnel Precautions:	
Environmental Precautions:	
Spill Cleanup Measures:	Not applicable; scrape up excess from floor, then wash area with soap and water.
Other Precautions:	

SECTION 7 - HANDLING and STORAGE

Handling:	Avoid gross contamination of skin and eyes. If eye contact occurs, flush immediately with copious amounts of water and seek prompt medical aid.
Storage:	Store in cool, dry area in tightly closed container. Optimum storage is 65-80 deg F
Work Practices:	
Special Handling Procedures:	
Hygiene Practices:	

SECTION 8 - EXPOSURE CONTROLS, PERSONAL PROTECTION - EXPOSURE GUIDELINES

Engineering Controls:	Use appropriate engineering control such as process enclosures, local exhaust ventilation, or other engineering controls to control airborne levels below recommended exposure limits.Not required
Eye/Face Protection:	Wear appropriate protective glasses or splash goggles as described by 29 CFR 1910.133, OSHA eye and face protection regulation, or the European standard EN 166. Contact lenses should not be worn.
Skin Protection Description:	Cover as much of the exposed skin area as possible with appropriate clothing. If skin creams are used, keep the area covered to a minimum. & dbo_Section8.HandProtectionDescription
Respiratory Protection:	Not Applicable
Other Protective:	Eyewash and deluge shower should be available.

EXPOSURE GUIDELINES

Notes :

SECTION 9 - PHYSICAL and CHEMICAL PROPERTIES

Flash Point:	Not applicable
Flash Point Method:	
Auto Ignition Temperature:	

SECTION 10 - STABILITY and REACTIVITY

Chemical Stability:	Stable
Reactivity:	
Hazardous Polymerization:	Will not occur
Conditions to Avoid:	None
Incompatible Materials:	None
Special Decomposition Products:	

SECTION 11 - TOXICOLOGICAL INFORMATION

SECTION 12 - ECOLOGICAL INFORMATION

SECTION 13 - DISPOSAL CONSIDERATIONS

SECTION 14 - TRANSPORT INFORMATION

DOT Shipping Name:	Non-Regulated
DOT UN Number:	
DOT Hazard Class:	Non-Regulated
DOT Packing Group:	

SECTION 15 - REGULATORY INFORMATION

SECTION 16 - ADDITIONAL INFORMATION

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http://www.actio.net

Epoxy Resin

MATERIAL SAFETY DATA SHEET

REVISION DATE: 04-1-2001 SUPERSEDES: 08-21-2001

SECTION 1. CHEMICAL PRODUCT AND COMPANY IDS IDENTIFICATION

COMPANY INFORMATION

Global Coatings Division

H.B. Fuller Company

2900 Granada Lane

Oakdale,MN 55128

Phone: 651-236-3700

Medical Emergency Phone Numbs (24 Hours): 1-888-853-1758

Transport Emergency Phone Number (CHEMTREC): 1-800-424-9300

PRODUCT INFORMATION

PRODUCT IDENTIFIER: 810564PM
PRODUCT NUMBER: IF1947T
PRODUCT DESCRIPTION: Powder coating

SECTION 2: COMPOSITION/INFORMATION ON INGREDIENTS

Unlisted ingredients are not 'hazardous' per the Occupational Safety and Health Administration Hazard Communication Standard (29 CFR 1910.1200) and/or are not found on the Canadian Workplace Hazardous Materials Information System ingredient disclosure list See Section 8 for any additional exposure limit guidelines.

Chemical Name	CAS #	PERCENT	OSHA PEL
Epoxy resin	25036-25-3	50 - 70	Not established
Calcium carbonate	1317-65-3	10 - 30	TWA (Total dust) 15 MG/M3 TWA (Respirable dusty 5 MG/M3
Epoxy resin	28064-14-4	10 - 30	Not established
Bisphenol A	80-05-7	1-5	No established
Iron oxide	1332-37-2	1-5	TWA (as Fe) Fume 10 MG/M3
Aromatic amine	693-98-1	0.1-1	Not established
Crystalline silica	14808-60-7	0.1-1	TWA (Respirable dust) 0.1 MG/M3

SECTION 3: HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

Dust clouds in air can be ignited by electric sparks, hot surfaces and open flame.

MATERIAL SAFETY DATA SHEET

Can cause skin imitation. May cause allergic skin reaction.
May cause an allergic respiratory reaction.
Harmful if swallowed.
Cancer hazard.

HMIS RATING: HEALTH -- 1 FLAMMABILITY -- 1 REACTIVITY -- 0
See SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION for personal protective equipment recommendations.

POTENTIAL HEALTH EFFECTS BY ROUTE OF ENTRY

EYE: Can cause minor irritation, tearing and reddening. Can cause mechanical irritation if dusts are generated.
SKIN: Continued or prolonged contact may irritate the skin and cause a skin rash (dermatitis). May cause sensitization.
Can cause light sensitivity that results in a skin rash when exposed to sunlight or ultraviolet light sources.

INHALATION: Can cause minor respiratory irritation Dust may be slightly irritating to the respiratory tract.
Inhalation of dusts produced during cuffing, grinding or sanding of this product may cause irritation of the respiratory tract
May cause allergic respiratory reaction.
Overexposure to iron oxide dust/fume may cause siderosis. Overexposure to crystalline silica may cause silicosis.

INGESTION: Ingestion is not an anticipated route of exposure. Harmful if swallowed.

LONG-TERM (CHRONIC) HEALTH EFFECTS
TARGET ORGAN(S): Skin, Lungs

REGULATED CARCINOGEN STATUS:
Unless noted below, this product does not contain regulated levels of NTP, IARC, ACGIH, or OSHA listed carcinogens.

Crystalline silica

EXISTING HEALTH CONDITIONS AFFECTED BY EXPOSURE: Skin disease including eczema and sensitization; Lung disease

SECTION 4: FIRST AID MEASURES

IF IN EYES: Immediately flush eyes with plenty of water for at least 20 minutes retracting eyelids often. Tilt the head to prevent chemical from transferring to the uncontaminated eye. Get immediate medical attention and monitor the eye daily as advised by your physician Flush eye with water for 20 minutes. Get medical attention.

IF ON SKIN: Wash with soap and water. Remove contaminated clothing, launder immediately, and discard contaminated leather goods. Get medical attention immediately.

If VAPORS INHALED: Remove to fresh air. Call a physician if symptoms persist.

IF SWALLOWED: No hazard in normal industrial use. Do not induce vomiting. Seek medical attention if symptoms develop. Provide medical care provider with this MSDS.

SECTION 5: FIRE FIGHTING MEASURES

FLASH POINT:	Not applicable
AUTOIGNITION TEMPERATURE:	Not established
LOWER EXPLOSIVE LIMIT (% in air):	Not established
UPPER EXPLOSIVE LIMIT (% in air):	Not established
EXTINGUISHING MEDIA:	Use water spray, foam, dry chemical or carbon dioxide.

MATERIAL SAFETY DATA SHEET

UNUSUAL FIRE AND EXPLOSION HAZARDS: Material will burn in a fire. Normal LEL for powder coatings 0.04 to 0.07 ounces/cubic foot. Strong explosions are not expected below 0.4 to 0.7.

SPECIAL FIRE FIGHTING INSTRUCTIONS: Persons exposed to products of combustion should wear self contained breathing apparatus and full protective equipment.

HAZARDOUS COMBUSTION PRODUCTS: Carbon dioxide, Carbon monoxide

SECTION 6: ACCIDENTAL RELEASE MEASURES

SPECIAL PROTECTION: No health effects expected from the cleanup of this material if contact can be avoided. Follow personal protective equipment recommendations found in Section 8 of this MSDS.

CLEAN-UP: Avoid creating dusts. Eliminate ignition sources. If a vacuum is used, ensure that the material is wetted or otherwise treated so an explosive dust atmosphere is not created within the vacuum.

Transport Emergency Phone Number (CHEMTREC): 1-800-424-9300

SECTION 7: HANDLING AND STORAGE

Handling: Mildly irritating material. Avoid unnecessary exposure. Avoid creating dusts as an explosive dust air mixture can be created at high concentrations. If dusts are created, ensure no sources of ignition are present. Take precautionary measures to prevent electrostatic discharges.

Storage: Store in a cool, dry place.

Consult the Technical Data Sheet for specific storage instructions.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

EYE PROTECTION: Wear safety glasses with side shields when handling this product. Wear additional eye protection such as chemical splash goggles and/or face shield when the possibility exists for eye contact with splashing or spraying liquid, or airborne material. Have an eye wash station available.

SKIN PROTECTION: Prevent contact with this product. Wear chemically resistant gloves, long sleeved shirt, an apron, and other protective equipment depending on conditions of use.

GLOVES: Nitrite

RESPIRATORY PROTECTION: Respiratory protection may be required to avoid overexposure when handling this product. Use a respirator if general room ventilation is not available or sufficient to eliminate symptoms. NIOSH approved air ~ Expiator with dust/mist filter. Respirators should be selected by and used following requirements found in OSHA's respirator standard (29 CFR 1910.134).

VENTILATION:

EXPOSURE LIMITS:

Chemical Name	ACGIH EXPOSURE LIMITS	AIHA WEEL
Epoxy resin	Not established	Not established
Calcium carbonate	TWA (Total dust) 10 MG/M3	Not established

MATERIAL SAFETY DATA SHEET

Epoxy resin	Not established	Not established
Bisphenol A	Not established	Not established
Iron oxide	TWA (as Fe) Fume 5 MG/M3	Not established
Aromatic amine	Not established	Not established
Crystalline silica	TWA (Respirable dust) 0.05 MG/M3	Not established

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE:	Solid
COLOR:	Red
ODOR:	Neutral
ODOR THRESHOLD:	Not established
WEIGHT PER GALLON (lbs.):	11.58
SPECIFIC GRAVITY:	1.39
SOLIDS (% by weight):	100.0
	Not applicable
pH:	Not established
BOILING POINT (deg. C):	Not established
FREEZING/MELTING POINT (dew C):	Not established
VAPOR PRESSURE (mm Hg):	Not established
VAPOR DENSITY:	Not established
EVAPORATION RATE:	Not established
OCTANOL/WATER COEFFICIENT:	Not established

SECTION 10: STABILITY AND REACTIVITY

STABILITY:	Stable under normal conditions.
CHEMICAL INCOMPATIBILITY:	Not established
HAZARDOUS POLYMERIZATION:	Will not occur.
HAZARDOUS DECOMPOSITION PRODUCTS:	Carbon monoxide, Carbon dioxide

SECTION 11: TOXICOLOGICAL INFORMATION

CHEMICAL NAME	LD50/LC50
Epoxy resin	Oral LD50 Rat > 30 g/kg Inhalation LC50 Rat > 800 mg/cu m/4H Dermal LD50 Rabbit > 3 g/kg
Calcium carbonate	Not established

MATERIAL SAFETY DATA SHEET

Epoxy resin	Not established
Bisphenol A	Oral LD50 Ret = 3250 mg/kg Dermal LD50 Rabbit = 3 ml/kg
Iron oxide	Not established
Aromatic amine	Not established
Crystalline silica	Not established

TOXICOLOGY SUMMARY: No additional health information available.

SECTION 12: ECOLOGICAL INFORMATION

OVERVIEW: No ecological information available

No levels of volatile organic compound emissions are expected at ambient temperatures and pressure. Depending on powder chemistry, however, higher levels of VOC and low molecular weight hydrocarbons may be emitted at cure temperatures. Emissions data are best developed by monitoring actual plant conditions.

SECTION 13: DISPOSAL CONSIDERATIONS

To the best of our knowledge, this product does not meet the definition of hazardous waste under the U.S. EPA Hazardous Waste Regulations 40 CFR 261. Disposal via incineration at an approved facility is recommended. Consult state, local or provincial authorities for more restrictive requirements.

SECTION 14: TRANSPORTATION INFORMATION

Consult Bill of Lading for transportation information.

SECTION 15: REGULATORY INFORMATION

INVENTORY STATUS

U. S. EPA TSCA: This product is in compliance with the Toxic Substances Control Act's Inventory requirements.

CANADIAN CEPA DSL: This product is in compliance with the Canadian Domestic Substance List requirements.

If you need more information about the inventory status of this product call 651-236-5858.

TSCA Section 12(b) - Export Notice Requirements
This product contains a chemical substance that is currently on the EPA's Section 12(b) Export List. Contact the company Global Regulatory Group at 651/236-5858 for the identity of the Section 12(b) chemical(s).

FEDERAL REPORTING
EPA SARA Title III Section 313
Unless listed below, this product does not contain toxic chemical(s) subject to the reporting requirements of section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA) and 40 CFR part 72. EPA has advised that when a percentage range is listed the midpoint may be used to fulfill reporting obligations.

Chemical Name	CAS#	%
4,4'-Isopropylidenediphenol	80-05-7	1- 5

MATERIAL SAFETY DATA SHEET

WHMIS STATUS: Unless listed below, this product is not controlled under the Canadian Workplace Hazardous Materials Formation System.

D2B D2A

STATE REPORTING
This MSDS is not prepared for distribution in California.

SECTION 16: ADDITIONAL INFORMATION

This Material Safety Data Sheet is prepared to comply with the United States Occupational Safety and Health Administration (OSHA) Hazard Communication Standard (29 CFR 1910.1200) and the Canadian Workplace Hazardous Materials Information System (WHMIS).

Prepared by: The Global Regulatory Department
Phone: 651-236-5842

The information and recommendations set forth herein are believed to be accurate. Because some of the information is derived from information provided to the H.B. Fuller Company from its suppliers, and because the H.B. Fuller Company has no control over the conditions of handling and use, the H.B. Fuller Company makes no warranty, expressed or implied, regarding the accuracy of the data or the results to be obtained from the use thereof. The information is supplied solely for your information and consideration, and the H.B. Fuller Company assumes no responsibility for use or reliance thereon. It is the responsibility of the user of H.B. Fuller Company products to comply with all applicable federal, state and local laws and regulations.

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MSDS Number: 112
Revision Date: 4/20/2012
Supersedes Date: 05/04/2009

MATERIAL SAFETY DATA SHEET

Complies with OSHA Hazard Communication Standard 29 CFR 1910.1200

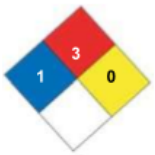
Product Name: LIQUID SOLDER FLUX

SECTION 1- PRODUCT AND COMPANY IDENTIFICATION

Product Type:	Solder Flux	**Emergency Contact:**	**Chemtrec**
Product Name:	**LIQUID SOLDER FLUX**	**Phone:**	**(800) 424-9300**
Part Number(s):	**10-4202** **10-4216**		

Common Name:	Liquid Solder Flux
Chemical Name:	Rosin Solder Flux
Family Usage:	Soldering Flux for Electrical or Electronic Applications
Description:	Mixture of the substances listed below with non-hazardous additions.
GHS Class:	Highly Flammable liquid and vapour

NFPA



This product has to be labeled due to the calculation procedure of international guidelines. Has a narcotizing effect. Highly flammable. Irritating to eyes. May cause sensitization by skin contact. Vapors may cause drowsiness and dizziness.

Least	0
Slight	1
Moderate	2
High	3
Extreme	4
Gloves, Safety Glasses	B

HMIS

Health Hazard	1
Fire Hazard	3
Reactivity	0
Personal Protection	x

* Chronic Health Effects

Information pertaining to particular dangers for man and environment:

Personal Protective Equipment

Chemical Splash Goggles | Safety Glasses | Protective Gloves

WHMIS Pictograms

Flammable | D2B Toxic

GHS Pictograms

Highly flammable liquid and vapour

DOT Pictograms

Flammable Liquid

Flux

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MATERIAL SAFETY DATA SHEET

Product Name: LIQUID SOLDER FLUX

SECTION 2 - COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name	CAS#	Ingredient Percent	EC Num.
Gum rosin	8050-09-7	30 - 60 by weight	
Isopropyl alcohol	67-63-0	30 - 60 by weight	

SECTION 3 - HAZARDS IDENTIFICATION

Emergency Overview:	DANGER! Flammable. Potential Sensitizer Flux fumes during soldering may cause irritation and damage of mucous membranes and respiratory system.
Route of Exposure:	Eyes. Skin. Inhalation. Ingestion.
Eye:	Eye contact with product or vapors may result in irritation, redness, and blurred vision. Smoke during soldering can cause eye irritation.
Skin:	May cause irritation. May cause skin sensitization, an allergic reaction, which becomes evident on reexposure to this material.
Inhalation:	Inhalation of vapors, fumes or mists of the product may be irritating to the respiratory system. May cause respiratory sensitization with asthma-like symptoms in susceptible individuals.
Ingestion:	May be harmful if swallowed. May cause vomiting.
Chronic Health Effects:	Prolonged or repeated contact may cause skin irritation. Repeated or prolonged inhalation may cause toxic effects.
Signs/Symptoms:	Overexposure may cause headaches and dizziness.
Target Organs:	Eyes. Skin. Respiratory system. Digestive system.
Aggravation of Pre-Existing Conditions:	None generally recognized.

SECTION 4 - FIRST AID MEASURES

Eye Contact:	Immediately flush eyes with plenty of water for 15 to 20 minutes. Get medical attention, if irritation or symptoms of overexposure persists.
Skin Contact:	Immediately wash skin with soap and plenty of water. Get medical attention if irritation develops or persists.
Inhalation:	If inhaled, remove to fresh air. If not breathing, give artificial respiration or give oxygen by trained personnel. Seek immediate medical attention.
Ingestion:	If swallowed, do NOT induce vomiting. Call a physician or poison control center immediately. Never give anything by mouth to an unconscious person.

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Product Name: LIQUID SOLDER FLUX

SECTION 5 - FIRE FIGHTING MEASURES

Flash Point:	18 °C (64 °F)
Auto Ignition Temperature:	425.0 °C (797 °F)
Lower Flammable/Explosive Limit:	2.0 % by volume
Upper Flammable/Explosive Limit:	12.0 % by volume
Extinguishing Media:	Use alcohol resistant foam, carbon dioxide, dry chemical, or water fog or spray when fighting fires involving this material.
Unsuitable Media:	Do not use a solid water stream as it may scatter and spread fire.
Protective Equipment:	As in any fire, wear Self-Contained Breathing Apparatus (SCBA), MSHA/NIOSH (approved or equivalent) and full protective gear.
Hazardous Combustion Byproducts:	Oxides of carbon, oxides of nitrogen, aliphatic aldehydes, and other organic substances may be formed during combustion..

NFPA Ratings:

NFPA Health:	1
NFPA Flammability:	3
NFPA Reactivity:	0

SECTION 6 - ACCIDENTAL RELEASE MEASURES

Personnel Precautions:	Evacuate area and keep unnecessary and unprotected personnel from entering the spill area. Avoid breathing vapor, aerosol or mist. Avoid contact with skin, eyes and clothing.
Environmental Precautions:	Avoid runoff into storm sewers, ditches, and waterways.
Methods for containment:	Contain spills with an inert absorbent material such as soil, sand or oil dry.
Methods for cleanup:	Remove all sources of ignition. Absorb spill with inert material (e.g., dry sand or earth), then place in a chemical waste container. Provide ventilation. Collect spill with a non-sparking tool. Place into a suitable container for disposal.

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Product Name: LIQUID SOLDER FLUX

SECTION 7 - HANDLING and STORAGE

Handling:	Use with adequate ventilation. Avoid breathing vapor and fumes. Use only in accordance with directions. To reduce potential for static discharge, bond and ground containers when transferring material.
Storage:	Store in a cool, dry, well ventilated area away from sources of heat, combustible materials, direct sunlight, and incompatible substances. Keep container tightly closed when not in use.
Special Handling Procedures:	DANGER! Rags, steel wool and waste soaked with this product may spontaneously catch fire if improperly discarded or stored. To avoid a spontaneous combustion fire, immediately after use, place rags, steel wool or waste in a sealed, water-filled, metal container.
Hygiene Practices:	Wash thoroughly after handling. Avoid inhaling vapors, mists, or fumes.

SECTION 8 - EXPOSURE CONTROLS, PERSONAL PROTECTION - EXPOSURE GUIDELINES

Engineering Controls:	Use appropriate engineering control such as process enclosures, local exhaust ventilation, or other engineering controls to control airborne levels below recommended exposure limits. Where such systems are not effective wear suitable personal protective equipment, which performs satisfactorily and meets OSHA or other recognized standards. Consult with local procedures for selection, training, inspection and maintenance of the personal protective equipment.
Eye/Face Protection:	Tightly fitting safety goggles. Wear a face shield also when splash hazards exist
Hand Protection Description:	Wear appropriate protective gloves. Consult glove manufacturer's data for permeability data. Nitrile rubber or natural rubber gloves are recommended.
Respiratory Protection:	A NIOSH approved air-purifying respirator with an organic vapor cartridge or canister may be permissible under certain circumstances where airborne concentrations are expected to exceed exposure limits. Protection provided by air purifying respirators is limited. Use a positive pressure air supplied respirator if there is any potential for an uncontrolled release, exposure levels are not known, or any other circumstances where air purifying respirators may not provide adequate protection.
Other Protective:	Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower.

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MATERIAL SAFETY DATA SHEET

Product Name: LIQUID SOLDER FLUX

SECTION 8 - EXPOSURE CONTROLS, PERSONAL PROTECTION - EXPOSURE GUIDELINES (CONTINUED)

Gum rosin :

Guideline ACGIH:	Sensitizer.: Sen

Isopropyl alcohol :

Guideline ACGIH:	TLV-STEL: 400 ppm TLV-STEL: 400 ppm
Guideline OSHA:	PEL-TWA: 400 ppm

SECTION 9 - PHYSICAL and CHEMICAL PROPERTIES

Physical State Appearance:	Liquid.
Color:	Amber
Odor:	Alcohol-like
Boiling Point:	82 °C (180 °F)
Melting Point:	Not determined.
Density:	0.880 g/cm³ @ 20°C (68°F)
Vapor Pressure:	33 mmHg @ 20°C (68°F)
Flash Point:	18 °C (64 °F)
Auto Ignition Temperature:	425.0 °C (797 °F)

SECTION 10 - STABILITY and REACTIVITY

Chemical Stability:	Stable under normal temperatures and pressures.
Hazardous Polymerization:	Not reported.
Conditions to Avoid:	Keep away from heat, ignition sources and incompatible materials.
Incompatible Materials:	Oxidizing agents. Strong acids and alkalis.
Special Decomposition Products:	When heated to soldering temperatures, the solvents are evaporated and rosin may be thermally degraded to liberate aliphatic aldehydes and acids.

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MATERIAL SAFETY DATA SHEET

Product Name: LIQUID SOLDER FLUX

SECTION 11 - TOXICOLOGICAL INFORMATION

Gum rosin :

RTECS Number:	VL0480000
Inhalation:	Inhalation. - Rat LC50: 110 mg/m3 [Behavioral - somnolence (general depressed activity) Cardiac - pulse rate Lungs, Thorax, or Respiration - respiratory depression] (RTECS)
Ingestion:	Oral - Mouse LD50: 2.2 mg/kg [Behavioral - somnolence (general depressed activity) Cardiac - pulse rate Lungs, Thorax, or Respiration - respiratory depression] Oral - Rat LD50: 3.0 mg/kg [Brain and Coverings - other degenerative changes Liver - other changes Biochemical - Metabolism (Intermediary) - other] (RTECS)

Isopropyl alcohol :

RTECS Number:	NT8050000
Eye:	Eye - Rabbit Standard Draize test: 100 mg Eye - Rabbit Standard Draize test: 10 mg Eye - Rabbit Standard Draize test: 100 mg/24H (RTECS)
Skin:	Administration onto the skin - Rabbit Standard Draize test: 500 mg Administration onto the skin - Rabbit LD50: 12800 mg/kg [Details of toxic effects not reported other than lethal dose value.] (RTECS)
Inhalation:	Inhalation. - Rat LC50: 16000 ppm/8H [Details of toxic effects not reported other than lethal dose value.] Inhalation. - Mouse LC50: 53000 mg/m3 [Behavioral - general anesthetic Lungs, Thorax, or Respiration - other changes] Inhalation. - Rat LC50: 72600 mg/m3 [Behavioral - general anesthetic Lungs, Thorax, or Respiration - other changes] (RTECS)
Ingestion:	Oral - Rat LD50: 5045 mg/kg [Behavioral - altered sleep time (including change in righting reflex) Behavioral - somnolence (general depressed activity)] Oral - Mouse LD50: 3600 mg/kg [Behavioral - altered sleep time (including change in righting reflex) Behavioral - somnolence (general depressed activity)] Oral - Mouse LD50: 3600 mg/kg [Behavioral - general anesthetic] Oral - Rat LD50: 5000 mg/kg [Behavioral - general anesthetic] (RTECS)

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MATERIAL SAFETY DATA SHEET

Product Name: LIQUID SOLDER FLUX

SECTION 12 - ECOLOGICAL INFORMATION

Ecotoxicity:	No ecotoxicity data was found for the product.
Environmental Fate:	No environmental information found for this product.

SECTION 13 - DISPOSAL CONSIDERATIONS

Waste Disposal:	Consult with the US EPA Guidelines listed in 40 CFR Part 261.3 for the classifications of hazardous waste prior to disposal. Furthermore, consult with your state and local waste requirements or guidelines, if applicable, to ensure compliance. Arrange disposal in accordance to the EPA and/or state and local guidelines.

SECTION 14 - TRANSPORT INFORMATION

DOT Shipping Name:	Isopropanol, mixture
DOT UN Number:	UN1219
DOT Hazard Class:	3
DOT Packing Group:	II
Label:	3 Flammable Liquids
Description:	Soldering Flux
IATA Shipping Name:	Isopropanol, mixture
IATA UN Number:	UN1219
IATA Hazard Class:	3
IATA Packing Group:	II
IMDG UN NUmber :	UN1219
IMDG Shipping Name :	Isopropanol, mixture
IMDG Hazard Class :	3
IMDG Packing Group :	II
RID UN Number :	UN1219
RID Shipping Name :	Isopropanol, mixture
RID Hazard Class :	3
RID Packing Group :	II

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MATERIAL SAFETY DATA SHEET

Product Name: LIQUID SOLDER FLUX

SECTION 15 - REGULATORY INFORMATION

Canada Reg. Status:	This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by the Controlled Products Regulations.
Canada WHMIS:	Controlled - Class: B2 Flammable Liquid Controlled - Class: D2B Toxic
Gum rosin :	
TSCA Inventory Status:	Listed
Canada DSL:	Listed
Isopropyl alcohol :	
TSCA Inventory Status:	Listed
Canada DSL:	Listed

WHMIS Pictograms

SECTION 16 - ADDITIONAL INFORMATION

GC Electronics believes that the information contained herein is accurate and reliable as of the date of this material safety data sheet, but no representation guarantee or warranty, express or implied, is made as to the accuracy, reliability or completeness of the information. Persons receiving information are encouraged to make their own determination as to the information's suitability and completeness for their particular application.
NO INFORMATION CONTAINED HEREIN CONSTITUTES A PRODUCT WARRANTY OF ANY KIND, WHETHER EXPRESS OR IMPLIED; AND ALL IMPLIED WARRANTIES OF MERCHANT ABILITY AND OF FITNESS FOR A PARTICULAR PURPOSE ARE HEREBY DISCLAIMED BY GC ELECTRONICS.

Foam (Last-A-Foam FR-7100)

GENERALPLASTICS
MANUFACTURING COMPANY

MATERIAL SAFETY DATA SHEET

Product: **LAST-A-FOAM® FR-7100**

Revision 12/1/13
Prepared by Chemical Lab

GENERAL INFORMATION

General Plastics Manufacturing Company
4910 Burlington way
P.O. Box 9097
Tacoma, WA 98409

Product Information:

LAST-A-FOAM® FR-7100 is a closed-cell rigid polyurethane foam. All substances used to manufacture **LAST-A-FOAM® FR-7100** is listed on the TSCA inventory.

*Last two digits indicate density in pounds/cubic foot

PHYSICAL CHEMICAL DATA

HAZARDOUS INGREDIENTS	None
FORM	Cellular Solid
WATER SOLUBILITY	Not soluble
SPECIFIC GRAVITY	0.05 to 0.60
VAPOR PRESSURE	Not applicable

FIRE AND EXPLOSION DATA

FLASH POINT	None. Tests similar to Cleveland open cup indicate ignition temperature is >600°F. **LAST-A-FOAM® FR-7100 forms** a solid char when exposed to flame and will essentially retain its shape until it is extinguished.
EXTINGUISHING MEDIA	Dry chemical, carbon dioxide, water or foam spray.
SPECIAL PROCEDURES	During a fire: carbon monoxide, nitrogen oxides and other polymer fragments that may be highly toxic and/or irritating may be present. Self-contained breathing apparatus and full protective gear should be used.

Polyurethane foam dust, like most dusts, can present an explosion risk. However, a dust collection system necessary for a suitable work environment is more than adequate to eliminate this risk. General Plastics Manufacturing Company has used a dust collection system and over many years of experience in cutting, planing, shaping, routing and sanding **LAST-A-FOAM®** polyurethane foam has never experienced any fire or explosion hazards.

REACTIVITY DATA

INCOMPATIBLE MATERIALS	None, this product is stable and chemically inert

HEALTH HAZARDS

INGESTION	Urethane foams are generally considered not toxic; however, all ingestion is to be avoided.
EYE CONTACT	See comments about dust below
SKIN CONTACT	See comments about dust below
INHALATION	**LAST-A-FOAM® FR-7100** foams are chemically inert. This foam has been developed to minimize dust generated in machining operations. Minor amounts of foam dust may generated in many operations and a dust collection system is normally used for a suitable work environment. Studies published by Upjohn in the Technical Bulletin No. 107 show no sensitization on skin contact with rigid polyurethane foam dust, and the many years of experience in cutting, planing shaping, routing, and sanding rigid polyurethane foams at General Plastics Manufacturing Company is in agreement with these studies. The studies by Upjohn show no inhalation problems which are peculiar to polyurethane foam dust. Normal protective equipment, such as gloves, eye goggles and masks that mechanically filter the dust may be necessary in operations where significant amount dust is generated.

Note: Tests with Sprague-Dawley rats at 8.65mg/cubic meter of polyurethane dust show no carcinogenic effects.

Medical conditions that may be aggravated by exposure include asthma, bronchitis, emphysema, skin allergies, and eczema.

The possibility exists that individuals who are very sensitive to isocyanates may also be sensitive to the reacted foam. Should this be the case, those individuals need to be assigned to an area which does not have polyurethane foam.

FIRST AID PROCEDURES

SKIN	Wash with soap and water. Seek medical attention if redness persists.
EYES	Immediately flush with plenty of water to remove dust particles. If irritation is severe and/or is not promptly relieved by washing seek medical attention.
INGESTION	Not applicable
INHALATION	Move to fresh air
NOTE	Any worker exposed to polyurethane dust who develops symptoms of irritation (dermatitis, respiratory problems, puffiness around the eyes, etc.) should seek medical attention.

SPILL AND DISPOSAL

SPILL	Not applicable
DISPOSAL	Dispose of in accordance with state and Federal regulations

SPECIAL PROTECTION INFORMATION

RESPIRATORY	If cutting, machining, or drilling normal ventilation for standard manufacturing procedures is generally adequate. Dust collection systems and/or dust masks should be used as appropriate to reduce excessive inhalation of dust.
SKIN	Standard shop coats, arm protectors and gloves should be used if extensive skin contact with dusts from machining work is possible.
EYE PROTECTION	Side shield goggles required for normal drilling and cutting operations are used to protect eyes from particles and dusts.

ADDITIONAL PRECAUTIONS

HANDLING	Not applicable
STORAGE	Will yellow on surface with sunlight or with time

OTHER REGULATORY INFORMATION

TRANSPORTATION DATA	**LAST-A-FOAM® FR-7100** is not regulated or classified in a manner that requires special handling or precautions in shipment.

CANADIAN REGULATORY INFORMATION

With respect to Canadian regulations for Controlled and Not Controlled Products, **LAST-A-FOAM® FR-7100** is not a Controlled Product.

With respect to the Canadian New Substances Notification Regulation, this foam meets the requirements for definition as an article; therefore, **LAST-A-FOAM® FR-7100** is exempt by the provision for an Article Exemption.

G10 Fiberglass

You Know It's Right... When It's Accurate PLASTICS, INC

8667K SERIES

Accurate Plastics, Inc.
18 Morris Place
Yonkers, New York 10705-1929
Phone (914) 476-0700
Fax (914) 476-0527

MATERIAL SAFETY DATA SHEET

PRODUCT NAME:	**Acculam™ Epoxyglas (NEMA Grades G10, G11, FR4, FR5)**

SECTION 1	**NAME & HAZARD SUMMARY**

MANUFACTURER'S NAME:	Accurate Plastics, Inc.
ADDRESS:	18 Morris Place Yonkers, New York 10705-1929
EMERGENCY PHONE NUMBER:	914-476-0700
DATE PREPARED:	11/30/01

SECTION 2	**HAZARDOUS INGREDIENTS / IDENTITY INFORMATION**

No OSHA Hazardous Ingredients
Hazardous Mixtures of other Liquids, Solids or Gases %
NOT APPLICABLE

TLV	ACGIH

Ingredients not precisely identified are proprietary or non hazardous. All ingredients appear on the EPA TSCA Inventory. Values are not product specifications.
gt = greater than, lt = less than, ca = approximately

Hazard summary (as defined by OSHA Communications Standard, 29 CFR 1910.1200) :

PHYSICAL HAZARDS:	If material is sawed or machined, dust can be a hazard.
HEALTH HAZARDS:	Dust inhalation (TLV)
PRODUCT DESCRIPTION:	Product is composed of a thermoplastic polymer modified epoxy resin and E-glass cloth. It may contain halogenated organic compounds as a flame retardant, i.e. tetrabromobisphenol A derivatives.

SECTION 3	**PHYSICAL DATA**

MELTING POINT:	Not determined
BOILING POINT :	Not applicable
VAPOR PRESSURE (mmhg at 20° C) :	Not applicable
VAPOR DENSITY (air = 1) :	Not applicable
SOLUBILITY IN WATER :	Insoluble
PH :	Not applicable
SPECIFIC GRAVITY (H2O=0) (typical) :	1.6
% VOLATILE BY WEIGHT :	< 0.05%
APPEARANCE AND ODOR :	Odorless solid

SECTION 4 FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (AND METHOD) :	Not applicable
AUTO IGNITION TEMPERATURE :	Not applicable
FLAMMABLE LIMITS (STP) :	Not applicable
EXTINGUISHING MEDIA :	Water, foam, carbon dioxide

SPECIAL FIRE FIGHTING PROTECTIVE EQUIPMENT :
Self-contained breathing apparatus with full face piece and protective clothing.
UNUSUAL FIRE AND EXPLOSION HAZARDS:
Dust from dry fabrication may be explosive if mixed with air in critical proportions in the presence of ignition source.

SECTION 5 REACTIVITY DATA

STABILITY :	Stable under normal conditions. (Avoid heating above 450° F.)
INCOMPATIBILITY (MATERIALS TO AVOID) :	Exposure to strong acids or bases will cause surface damage.
HAZARDOUS DECOMPOSITION PRODUCTS :	Combustion products : Small quantities of HCN, CO, CO_2, approximately same as wood
HAZARDOUS POLYMERIZATION :	Will not occur. (Avoid heating above 450° F.)

SECTION 6 HEALTH HAZARD ASSESSMENT

GENERAL :	The health hazard assessment is based on an evaluation of the chemical composition together with information from a search of the scientific literature and other commercial sources.
INGESTION :	None
EYE CONTACT :	No irritation is likely to develop following contact with human eyes.
SKIN CONTACT :	No irritation is likely to develop following contact with human skin.
SKIN ABSORPTION :	This product will probably not be absorbed through human skin.
INHALATION :	May occur when sawing or machining.
OTHER EFFECTS OF OVEREXPOSURE :	Dust can cause irritation to the eyes, nose, throat, and lungs. Prolonged inhalation of dust can produce lung disease.
FIRST AID PROCEDURES :	Remove to fresh air.
SKIN :	Wash material off the skin with plenty of soap and water. If redness, itching, or a burning sensation develops, get medical attention. For thermal burns, cool quickly with water and get medical attention. Do not peel off solidified material.

EYES :	Immediately flush with plenty of water. After initial flushing, remove any contact lenses and continue flushing for at least 15 minutes. If redness, itching, or a burning sensation develops, have eyes examined and treated by medical personnel.
INGESTION :	Give one or two glasses of water to drink. If gastrointestinal symptoms develop, consult medical personnel. (Never give anything by mouth to an unconscious person.)
NOTE TO PHYSICIAN :	Prolonged eye irritation may occur from pieces of debris sticking to the eyeball or eyelids.

SECTION 7 PRECAUTIONS FOR SAFE HANDLING AND USE

STEPS TO BE TAKEN IN CASE MATERIAL IS SPILLED:	None - solid material
DISPOSAL METHOD :	Must comply with federal, state and local laws.
CONTAINER DISPOSAL :	Puncture or otherwise destroy packaging material before disposal.

SECTION 8 CONTROL MEASURES

TLV® OR SUGGESTED CONTROL VALUE :
No TLV is assigned to this mixture. Minimize exposure to dust that may be generated from processing operations such as sawing or machining, in accordance with good hygiene practice.
API recommends that particle concentration be controlled to within the TLV level of 10mg / m3 or nuisance particles. The OSHA PEL for nuisance particles is 15 mg /m3.
VENTILATION :
Remove decomposition fumes with local exhaust if overheating occurs during processing (above 150°C).
RESPIRATORY PROTECTION (SPECIFY TYPE) :
If needed, use MSHA-NIOSH approved respirator for dusts, mists, and fumes whose TLV is greater than 0.05 mg/m3.
PROTECTIVE CLOTHING :
Use work gloves to avoid cuts from sharp edges. Protect from thermal effects when handling heated material.
EYE PROTECTION :
Safety glasses with side shields.
OTHER PROTECTIVE EQUIPMENT :
Eyewash station in work area.

SECTION 9 SPECIAL PRECAUTIONS OR OTHER COMMENTS

Use dust collection for sawing or machining.

The information herein is given in good faith
but no warranty, expressed or implied, is made.

Accurate Plastics, Inc. expressly disclaims any liability which may
be incurred in using the information contained herein.

G12 Fiberglass

ITEN INDUSTRIES
MATERIAL SAFETY DATA SHEET

========== Section 1 - Facility Information ==========

Manufacturer's
Name & Address:

Iten Industries
P.O. Box 2150
Ashtabula, OH 44005

Emergency Telephone: 1-800-852-2482
(American Alert)
MSDS Information : (440) 997-6134
Latest Revision : 11 June 2004

========== Section 2 - Product Information ==========

Product Name : RESITEN GRADE G12
Color : Natural, black
Description : Rigid epoxy polymer composite reinforced with fiberglass fabric

========== Section 3 - Hazardous Ingredients ==========

Chemical Name	CAS #	WT%	ACGIH TLV	OSHA PEL
Fibrous glass	65997-17-3	40 - 60	10 mg/m^3 *	15 mg/m^3 *
Cured epoxy polymer	25085-99-8	40 - 60	10 mg/m^3 *	15 mg/m^3 *

* Total dust fraction for an 8 hr TWA

========== Section 4 - Physical Data ==========

Boiling point - NA
Melting point - NA
Sp. Gravity (H_2O=1) - 1.80 to 2.00
Vapor pressure - NA
Vapor density - NA
Solubility in water - NA
Evaporation rate
(butyl acetate = 1) - NA
Appearance and odor - Green (natural) or pigmented solid with a faint odor of epoxy

========== Section 5 - Fire and Explosion Hazard Data ==========

Flashpoint (CCC) - NA
Flammable limits - LEL: NA UEL: NA
Extinguishing media - Water, Carbon Dioxide (CO_2), or foam

Special Fire Fighting Procedures - Conventional fire fighting procedures are to be used. Self contained NIOSH / MSHA approved breathing apparatus should be worn when entering a burning area.

Unusual Fire and Explosion Hazards - Smoke released while burning may contain some toxic fumes.

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========== Section 6 - Reactivity Data ==========

Stability - Stable

Hazardous Decomposition Products - Small quantities of HCN, HBr, CO_2, CO, and other hydrocarbons

Hazardous Polymerization - Will not occur X

Conditions to avoid - Material is attacked slowly by strong oxidizing agents.

========== Section 7 - Health Hazard Data ==========

Route(s) of Entry -	Inhalation	Skin	Ingestion
As nuisance dust	X	X	X

Health Hazards (Acute and Chronic) - Chronic: A small proportion of exposed people may develop an allergic reaction after prolonged or repeated exposure.

	NTP	IARC Monographs	OSHA Regulated
Carcinogenicity -	No	No	No

Symptoms of exposure - Nuisance dust may cause minor irritations to eyes and respiratory passages.

Medical conditions which may be aggravated by exposure - Unknown, possibly allergies. Inhalation of dust may aggravate respiratory disorders. Dust contact with skin may aggravate pre-existing skin disorders.

Emergency and First Aid Procedures - For dust contamination, wash eyes with water for 15 minutes, wash skin with soap and water, and remove and wash clothes. If symptoms persist seek medical attention.

========== Section 8 - Precautions for Safe Handling and Use ==========

Steps to be taken in case of spill - NA

Waste Disposal - Landfill or incinerate according to applicable federal, state, and local laws.

Handling and Storage - Sheets will slide if stacked too high and not restrained properly. Nuisance dust is present in boxes of fabricated parts.

========== Section 9 - Control Measures to be Followed ==========

Respiratory protection - Avoid inhalation of dust. Use NIOSH / MSHA approved dust respirator if ventilation system is not able to adequately remove nuisance dust.

Protective gloves - Use of gloves will help prevent cuts and abrasion by sharp edges, and must be worn if an allergic condition exists.

Eye protection - Safety glasses, with faceshield or goggles if required when processing.

Ventilation - Local Exhaust: Recommended Special: NA
Mechanical : Dust collector Other : NA
system when machining

Other precautions - Exhaust fumes when heating, and wear protective clothing to prevent contact with dust. Wash hands before handling food. Do not eat, drink, or smoke in a dusty environment. Do not ingest material or dust.

====== Section 10 - SARA Section 313 Supplier Notification ======

Applicable Chemical / Category	CAS Number	WT %

This product does not contain toxic chemicals subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372.

The information contained herein is based upon data taken from sources considered to be accurate and reliable. Iten Industries, however, makes no warranty, expressed or implied, concerning the accuracy of the information. Since the conditions of methods of the use are beyond our control, Iten Industries does not assume any responsibility and expressly disclaims any liability for use of this material, the hazards connected with the use of this material or the results to be obtained from the use thereof except as warranted in our written contract of sale or acknowledgement.

Heat Shrink Tubing

3M

Material Safety Data Sheet

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SECTION 1: PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: ITCSN Heat Shrink Tubing
MANUFACTURER: 3M
DIVISION: Electrical Markets Division

ADDRESS: 3M Center
St. Paul, MN 55144-1000

EMERGENCY PHONE: 1-800-364-3577 or (651) 737-6501 (24 hours)

Issue Date: 06/10/09
Supercedes Date: Initial Issue

Document Group: 26-5943-1

Product Use:
Intended Use: Electrical
Specific Use: Insulating and sealing power distribution cable splices

SECTION 2: INGREDIENTS

Ingredient	C.A.S. No.	% by Wt
Adhesive Lined Polyolefin Tubing - Flame Retardant	Mixture	100

SECTION 3: HAZARDS IDENTIFICATION

3.1 EMERGENCY OVERVIEW

Odor, Color, Grade: ADHESIVE LINED TUBING, VARIOUS SIZES, ODORLESS
General Physical Form: Solid
Immediate health, physical, and environmental hazards: Contact with aluminum or zinc in a pressurized system may generate hydrogen gas which could create an explosion hazard. May cause thermal burns.

3.2 POTENTIAL HEALTH EFFECTS

Eye Contact:

Vapors from heated material may cause eye irritation. Signs/symptoms may include redness, swelling, pain, tearing, and blurred or hazy vision.

During heating:
Thermal Burns: Signs/symptoms may include severe pain, redness and swelling, and tissue destruction.

Skin Contact:
During heating:
Thermal Burns: Signs/symptoms may include intense pain, redness and swelling, and tissue destruction.

Inhalation:
Vapors from heated material may cause irritation of the respiratory system. Signs/symptoms may include cough, sneezing, nasal discharge, headache, hoarseness, and nose and throat pain.

Ingestion:
No health effects are expected.

Ingredient	C.A.S. No.	Class Description	Regulation
BENZIDINE DYES	NONE	Group 2A	International Agency for Research on Cancer
BENZIDINE DYES	NONE	Known human carcinogen	National Toxicology Program Carcinogens
CARBON BLACK EXTRACTS	NONE	Group 2B	International Agency for Research on Cancer
DICHLOROBENZIDINE SALTS	NONE	Cancer hazard	OSHA Carcinogens
DICHLOROBENZIDINES	NONE	Cancer hazard	OSHA Carcinogens

SECTION 4: FIRST AID MEASURES

4.1 FIRST AID PROCEDURES

The following first aid recommendations are based on an assumption that appropriate personal and industrial hygiene practices are followed.

Eye Contact: Immediately flush eyes with large amounts of water for at least 15 minutes. DO NOT ATTEMPT TO REMOVE MOLTEN MATERIAL. Get immediate medical attention.

Skin Contact: Immediately flush skin with large amounts of cold water for at least 15 minutes. DO NOT ATTEMPT TO REMOVE MOLTEN MATERIAL. Cover affected area with a clean dressing. Get immediate medical attention.

Inhalation: If signs/symptoms develop, remove person to fresh air. If signs/symptoms persist, get medical attention.

If Swallowed: No need for first aid is anticipated.

SECTION 5: FIRE FIGHTING MEASURES

5.1 FLAMMABLE PROPERTIES

Autoignition temperature	*No Data Available*
Flash Point	*Not Applicable*
Flammable Limits - LEL	*Not Applicable*
Flammable Limits - UEL	*Not Applicable*
OSHA Flammability Classification:	Not Applicable

5.2 EXTINGUISHING MEDIA
Use fire extinguishers with class B extinguishing agents (e.g., dry chemical, carbon dioxide).

5.3 PROTECTION OF FIRE FIGHTERS

Special Fire Fighting Procedures: Wear full protective equipment (Bunker Gear) and a self-contained breathing apparatus (SCBA).

Unusual Fire and Explosion Hazards: Contact with aluminum or zinc in a pressurized system may generate hydrogen gas which could create an explosion hazard.

Note: See STABILITY AND REACTIVITY (SECTION 10) for hazardous combustion and thermal decomposition information.

SECTION 6: ACCIDENTAL RELEASE MEASURES

Accidental Release Measures: Not applicable.

In the event of a release of this material, the user should determine if the release qualifies as reportable according to local, state, and federal regulations.

SECTION 7: HANDLING AND STORAGE

7.1 HANDLING
Keep away from aluminum and zinc. Avoid skin contact with hot material. Avoid eye contact with vapors, mists, or spray. For industrial or professional use only. Avoid eye contact with dust or airborne particles.

7.2 STORAGE
Store away from heat. Store in a cool, dry place.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 ENGINEERING CONTROLS
Provide appropriate local exhaust when product is heated. Provide ventilation adequate to control dust concentrations below recommended exposure limits and/or control dust. Use general dilution ventilation and/or local exhaust ventilation to control airborne exposures to below Occupational Exposure Limits and/or control dust, fume, or airborne particles. If ventilation is not adequate, use respiratory protection equipment.

8.2 PERSONAL PROTECTIVE EQUIPMENT (PPE)

8.2.1 Eye/Face Protection
Avoid eye contact with vapors, mists, or spray.

8.2.2 Skin Protection
Wear appropriate gloves, such as Nomex, when handling this material to prevent thermal burns. Avoid skin contact. Avoid skin contact with hot material. Select and use gloves and/or protective clothing to prevent skin contact based on the results of an exposure assessment. Consult with your glove and/or protective clothing manufacturer for selection of appropriate compatible materials.

8.2.3 Respiratory Protection

Select one of the following NIOSH approved respirators based on airborne concentration of contaminants and in accordance with OSHA regulations: Half facepiece air-purifying respirator with organic vapor/acid gas cartridges and P95 particulate prefilters, Half facepiece air-purifying respirator with organic vapor/acid gas cartridges and N95 particulate prefilters, Half facepiece air-purifying respirator with organic vapor/acid gas cartridges and P100 particulate prefilters. Consult the current 3M Respiratory Selection Guide for additional information or call 1-800-243-4630 for 3M technical assistance.

8.2.4 Prevention of Swallowing
Not applicable.

8.3 EXPOSURE GUIDELINES

Ingredient	Authority	Type	Limit	Additional Information
ANTIMONY COMPOUNDS	ACGIH	TWA, as Sb	0.5 mg/m3	
ANTIMONY COMPOUNDS	OSHA	TWA, as Sb	0.5 mg/m3	Table Z-1A
STEARATES	ACGIH	TWA, as total dust	10 mg/m3	Table A4

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Odor, Color, Grade:	ADHESIVE LINED TUBING, VARIOUS SIZES, ODORLESS
General Physical Form:	Solid
Autoignition temperature	*No Data Available*
Flash Point	*Not Applicable*
Flammable Limits - LEL	*Not Applicable*
Flammable Limits - UEL	*Not Applicable*
Boiling point	*Not Applicable*
Vapor Density	*Not Applicable*
Vapor Pressure	*Not Applicable*
Specific Gravity	0.99 - 1.25 Units not avail. or not appl. [*Ref Std:* WATER=1]
pH	*Not Applicable*
Melting point	*No Data Available*
Solubility in Water	Nil
Evaporation rate	*Not Applicable*
Volatile Organic Compounds	*Not Applicable*
Percent volatile	*Not Applicable*
VOC Less H2O & Exempt Solvents	*Not Applicable*
Viscosity	*Not Applicable*

SECTION 10: STABILITY AND REACTIVITY

Stability: Stable.

Materials and Conditions to Avoid: Reactive metals; High shear and high temperature conditions

Hazardous Polymerization: Hazardous polymerization will not occur.

Hazardous Decomposition or By-Products

Substance	Condition
Carbon monoxide	During Combustion
Carbon dioxide	During Combustion
Hydrogen Bromide	During Combustion
Irritant Vapors or Gases	At Elevated Temperatures - above 250 C
Oxides of Antimony	During Combustion

SECTION 11: TOXICOLOGICAL INFORMATION

Please contact the address listed on the first page of the MSDS for Toxicological Information on this material and/or its components.

SECTION 12: ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL INFORMATION

Not determined.

CHEMICAL FATE INFORMATION

Not determined.

SECTION 13: DISPOSAL CONSIDERATIONS

Waste Disposal Method: Incinerate in an industrial or commercial facility in the presence of a combustible material. Combustion products will include HCl. Facility must be capable of handling halogenated materials.
As a disposal alternative, dispose of waste product in a facility permitted to accept chemical waste.

EPA Hazardous Waste Number (RCRA): Not regulated

Since regulations vary, consult applicable regulations or authorities before disposal.

SECTION 14:TRANSPORT INFORMATION

Please contact the emergency numbers listed on the first page of the MSDS for Transportation Information for this material.

SECTION 15: REGULATORY INFORMATION

US FEDERAL REGULATIONS
Contact 3M for more information.

311/312 Hazard Categories:
Fire Hazard - No Pressure Hazard - No Reactivity Hazard - No Immediate Hazard - No Delayed Hazard - No

STATE REGULATIONS
Contact 3M for more information.

CALIFORNIA PROPOSITION 65

Ingredient	C.A.S. No.	Classification
BENZIDINE DYES	NONE	**Carcinogen
CARBON BLACK EXTRACTS	NONE	**Carcinogen

** WARNING: contains a chemical which can cause cancer.

CHEMICAL INVENTORIES
This product is an article as defined by TSCA regulations, and is exempt from TSCA Inventory listing requirements.

Contact 3M for more information.

INTERNATIONAL REGULATIONS
Contact 3M for more information.

This MSDS has been prepared to meet the U.S. OSHA Hazard Communication Standard, 29 CFR 1910.1200.

SECTION 16: OTHER INFORMATION

NFPA Hazard Classification

Health: 1 **Flammability:** 1 **Reactivity:** 0 **Special Hazards:** None

National Fire Protection Association (NFPA) hazard ratings are designed for use by emergency response personnel to address the hazards that are presented by short-term, acute exposure to a material under conditions of fire, spill, or similar emergencies. Hazard ratings are primarily based on the inherent physical and toxic properties of the material but also include the toxic properties of combustion or decomposition products that are known to be generated in significant quantities.

HMIS Hazard Classification

Health: 1 **Flammability:** 1 **Reactivity:** 0 **Protection:** B

Hazardous Material Identification System (HMIS(r)) hazard ratings are designed to inform employees of chemical hazards in the workplace. These ratings are based on the inherent properties of the material under expected conditions of normal use and are not intended for use in emergency situations. HMIS(r) ratings are to be used with a fully implemented HMIS(r) program. HMIS(r) is a registered mark of the National Paint and Coatings Association (NPCA).

No revision information is available.

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3M MSDSs are available at www.3M.com

Hexanediamine (Rip stop Nylon)

Material Safety Data Sheet
1,6-hexanediamine MSDS

Section 1: Chemical Product and Company Identification

Product Name: 1,6-hexanediamine

Catalog Codes: SLH2881

CAS#: 124-09-4

RTECS: MO1180000

TSCA: TSCA 8(b) inventory: 1,6-hexanediamine

CI#: Not available.

Synonym: Hexamethylenediamine

Chemical Formula: C6H16N2

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:
1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
{1,6-}hexanediamine	124-09-4	100

Toxicological Data on Ingredients: 1,6-hexanediamine: ORAL (LD50): Acute: 750 mg/kg [Rat]. DERMAL (LD50): Acute: 1110 mg/kg [Rabbit].

Section 3: Hazards Identification

Potential Acute Health Effects:
Extremely hazardous in case of skin contact (irritant), of eye contact (irritant). Very hazardous in case of skin contact (corrosive). Hazardous in case of skin contact (sensitizer), of inhalation. The amount of tissue damage depends on length of contact. Eye contact can result in corneal damage or blindness. Skin contact can produce inflammation and blistering. Inhalation of dust will produce irritation to gastro-intestinal or respiratory tract, characterized by burning, sneezing and coughing. Severe over-exposure can produce lung damage, choking, unconsciousness or death. Inflammation of the eye is characterized by redness, watering, and itching. Skin inflammation is characterized by itching, scaling, reddening, or, occasionally, blistering.

Potential Chronic Health Effects:
Extremely hazardous in case of skin contact (irritant), of eye contact (irritant). Very hazardous in case of skin contact (corrosive). Hazardous in case of skin contact (sensitizer), of inhalation. CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance is toxic to blood, kidneys, lungs, liver. Repeated or prolonged exposure to the substance can

p. 1

produce target organs damage. Repeated exposure of the eyes to a low level of dust can produce eye irritation. Repeated skin exposure can produce local skin destruction, or dermatitis. Repeated inhalation of dust can produce varying degree of respiratory irritation or lung damage. Repeated or prolonged inhalation of dust may lead to chronic respiratory irritation.

Section 4: First Aid Measures

Eye Contact:
Check for and remove any contact lenses. Immediately flush eyes with running water for at least 15 minutes, keeping eyelids open. Cold water may be used. Do not use an eye ointment. Seek medical attention.

Skin Contact:
If the chemical got onto the clothed portion of the body, remove the contaminated clothes as quickly as possible, protecting your own hands and body. Place the victim under a deluge shower. If the chemical got on the victim's exposed skin, such as the hands : Gently and thoroughly wash the contaminated skin with running water and non-abrasive soap. Be particularly careful to clean folds, crevices, creases and groin. Cold water may be used. If irritation persists, seek medical attention. Wash contaminated clothing before reusing.

Serious Skin Contact:
Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

Inhalation: Allow the victim to rest in a well ventilated area. Seek immediate medical attention.

Serious Inhalation:
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. WARNING: It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek immediate medical attention.

Ingestion:
Do not induce vomiting. Examine the lips and mouth to ascertain whether the tissues are damaged, a possible indication that the toxic material was ingested; the absence of such signs, however, is not conclusive. Loosen tight clothing such as a collar, tie, belt or waistband. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek immediate medical attention.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: May be combustible at high temperature.

Auto-Ignition Temperature: 285°C (545°F)

Flash Points: CLOSED CUP: 81.1°C (178°F).

Flammable Limits: LOWER: 0.7% UPPER: 6.3%

Products of Combustion: These products are carbon oxides (CO, CO2), nitrogen oxides (NO, NO2...).

Fire Hazards in Presence of Various Substances: Not available.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:
SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

Special Remarks on Fire Hazards: Material in powder form, capable of creating a dust explosion.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill: Use appropriate tools to put the spilled solid in a convenient waste disposal container.

Large Spill:
Corrosive solid. Stop leak if without risk. Do not get water inside container. Do not touch spilled material. Use water spray to reduce vapors. Prevent entry into sewers, basements or confined areas; dike if needed. Eliminate all ignition sources. Call for assistance on disposal.

Section 7: Handling and Storage

Precautions:
Keep container dry. Keep away from heat. Keep away from sources of ignition. Empty containers pose a fire risk, evaporate the residue under a fume hood. Ground all equipment containing material. Do not ingest. Do not breathe dust. Never add water to this product In case of insufficient ventilation, wear suitable respiratory equipment If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes

Storage:
Keep container dry. Keep in a cool place. Ground all equipment containing material. Corrosive materials should be stored in a separate safety storage cabinet or room.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection:
Splash goggles. Lab coat. Vapor and dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Vapor and dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits: Not available.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid.

Odor: Not available.

Taste: Not available.

Molecular Weight: 116.21 g/mole

Color: Not available.

pH (1% soln/water): Not available.

Boiling Point: 204°C (399.2°F)

Melting Point: 42°C (107.6°F)

Critical Temperature: Not available.

Specific Gravity: 0.8477 (Water = 1)

Vapor Pressure: Not applicable.

Vapor Density: 4 (Air = 1)

Volatility: 100% (v/v).

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water.

Solubility: Easily soluble in cold water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Not available.

Incompatibility with various substances: Not available.

Corrosivity: Not available.

Special Remarks on Reactivity: Not available.

Special Remarks on Corrosivity: Not available.

Polymerization: No.

Section 11: Toxicological Information

Routes of Entry: Eye contact. Inhalation.

Toxicity to Animals:
Acute oral toxicity (LD50): 750 mg/kg [Rat]. Acute dermal toxicity (LD50): 1110 mg/kg [Rabbit].

Chronic Effects on Humans: The substance is toxic to blood, kidneys, lungs, liver.

Other Toxic Effects on Humans:
Extremely hazardous in case of skin contact (irritant). Very hazardous in case of skin contact (corrosive). Hazardous in case of skin contact (sensitizer), of inhalation.

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Not available.

Special Remarks on other Toxic Effects on Humans: Not available.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are more toxic.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Section 14: Transport Information

DOT Classification: CLASS 8: Corrosive solid.

Identification: : Hexamethylenediamine : UN2280 PG: III

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:
Massachusetts RTK: 1,6-hexanediamine TSCA 8(b) inventory: 1,6-hexanediamine

Other Regulations: OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

Other Classifications:

WHMIS (Canada): CLASS E: Corrosive solid.

DSCL (EEC):
R21/22- Harmful in contact with skin and if swallowed. R34- Causes burns. R43- May cause sensitization by skin contact.

HMIS (U.S.A.):

Health Hazard: 3

Fire Hazard: 2

Reactivity: 0

Personal Protection: j

National Fire Protection Association (U.S.A.):

Health: 3

Flammability: 2

Reactivity: 0

Specific hazard:

Protective Equipment:
Gloves. Lab coat. Vapor and dust respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

Created: 10/09/2005 05:43 PM

Last Updated: 05/21/2013 12:00 PM

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Hot Glue

Material Safety Data Sheet

Ad-Tech 962 **MSDS No. 962-99**

Date of Preparation: Mar. 26,1999 page 1 of 3

Section 1 - Chemical Product and Company Identification

Product/Chemical Name: Ad-Tech 962
Product Description: Hot melt adhesive

Manufacturer: Adhesive Technologies, Inc., 3 Merrill Industrial Drive, Hampton, N.H. 03842, and Taipei Hsien, Taiwan. Phone (603)-926-1616, FAX (603) 926-1780 (Open 8 a.m. to 4 p.m. EST).

HMIS
H 0
F 0
R 0
PPE B
†Sec. 8

☆☆☆☆☆ **Emergency Overview** ☆☆☆☆☆

Section 2 - Composition / Information on Ingredients

Ingredient Name	CAS Number	% wt *or* % vol
This product is not hazardous as defined in 29 CFR 1910.1200	N/A	N/A

Toxicity Data: Conforms to ASTM D-4236 as non-toxic.

Section 3 - Physical and Chemical Properties

Physical State: 100% Solids.
Appearance and Odor: Yellow color with slight odor.
Vapor Pressure: Not applicable
Vapor Density (Air=1): Not applicable
Specific Gravity (H_2O=1, at 4 °C): .98
PH: 7.1

Water Solubility: Nil
Boiling Point: Not applicable.
Melting Point: 208°F (98°C).
Viscosity: 5,500 centipoise @ 350°F
% Volatile: Nil.
Evaporation Rate: Not applicable.

Section 4 - Fire-Fighting Measures

Flash Point: >450°F (>232 °C).
Flash Point Method: CC.
Autoignition Temperature: >800°F (>427 °C)

Extinguishing Media: Carbon Dioxide, Foam
Unusual Fire or Explosion Hazards: None.
Special Fire-Fighting Instructions: None.

Fire-Fighting Equipment: Because fire may produce toxic thermal decomposition products, wear a self-contained breathing apparatus (SCBA) with a full facepiece operated in pressure-demand or positive-pressure mode.

Section 5 - Stability and Reactivity

Stability: Stable
Polymerization: Hazardous polymerization will not occur.
Incompatibilities – Materials to avoid: Strong oxidizing agents.

Hazardous Decomposition Products: Thermal oxidative decomposition of Ad-Tech 962 can produce carbon monoxide and/or carbon dioxide.

Section 6 - Health Hazard Information

Potential Health Effects

Eyes: Vapors and fumes released at or above application temperature may cause irritation.
Inhalation: Vapors and fumes released at or above application temperature may cause irritation of the nose, throat and respiratory tract.
Skin: Hot molten adhesive will burn and blister skin tissue.
Ingestion: Ingestion is not a likely route of exposure. Small amounts are not anticipated to be harmful.
Carcinogenicity: IARC, NTP, and OSHA do not list Ad-Tech 962 as a carcinogen.
Medical Conditions Aggravated by Long-Term Exposure: No know effects on other illnesses.
Chronic Effects: No anticipated chronic effects.

Emergency and First Aid Procedures

Inhalation: If irritation occurs, remove to fresh air.
Eye Contact: hot molten adhesive will adhere to and burn eye and surrounding skin upon contact. Immediately flush affected area with cold water to cool adhesive. Do not pull solidified adhesive from eye. Seek medical attention.
Skin Contact: Hot molten adhesive will adhere to and burn skin upon contact. Immediately immerse affected area in ice water. Do not pull solidified adhesive from skin. Seek medical attention.
Ingestion: If ingested, seek medical attention.
After first aid, get appropriate in-plant, paramedic, or community medical support.
Note to Physicians: This adhesive was determined by a toxicologist to be non-toxic.
Special Precautions/Procedures: None.

Section 7 - Spill, Leak, and Disposal Procedures

Cleanup: Normal housekeeping and clean up (no special procedures).
Regulatory Requirements: None.
Disposal: Follow applicable Federal, state, and local regulations for proper disposal procedures.

EPA Regulations:
RCRA Hazardous Waste Number: Not applicable.
RCRA Hazardous Waste Classification: Not applicable.
CERCLA Hazardous Substance (40 CFR 302.4): unlisted, specific per RCRA, Sec. 3001; CWA, Sec. 311 (b)(4); CWA, Sec. 307(a), CAA, Sec. 112
CERCLA Reportable Quantity (RQ), Not applicable.
SARA 311/312 Codes: Not applicable.
SARA Toxic Chemical (40 CFR 372.65): Not listed
SARA EHS (Extremely Hazardous Substance) (40 CFR 355): Not applicable, non-hazardous.
OSHA Regulations:
Air Contaminant (29 CFR 1910.1000, Table Z-1, Z-1-A): Not applicable.
OSHA Specifically Regulated Substance (29CFR 1910). Not applicable.
State Regulations: None.

Section 8 - Exposure Controls / Personal Protection

Engineering Controls: Local ventilation recommended.
Ventilation: Provide general or local exhaust ventilation to areas using this adhesive. Local exhaust ventilation is preferred because it prevents contaminant dispersion into the work area by controlling it at its source.
Administrative Controls: Not applicable.
Respiratory Protection: Not required under normal use.
Protective Clothing/Equipment: Wear protective gloves and long sleeved shirt to prevent skin contact. Wear protective eyeglasses or safety goggles, per OSHA eye- and face-protection regulations (29 CFR 1910.133). Contact lenses are not eye protective devices. Appropriate eye protection must be worn instead of, or in conjunction with contact lenses.
Safety Stations: Make emergency eyewash stations, safety/quick-drench showers, and washing facilities available in work area.
Contaminated Equipment: Cooled adhesive may be removed from clothing by freezing affected area and picking off.
Comments: Never eat, drink, or smoke in work areas. Practice good personal hygiene after using this material, especially before eating, drinking, smoking, using the toilet, or applying cosmetics.

Section 9 - Special Precautions and Comments

Handling Precautions: No special handling necessary.
Storage Requirements: Store in cool dark area.

Prepared By: Dennis Fitzmeyer.
Revision Notes: Revised 10/13/09

Disclaimer:
The information provided here represents our current data and best opinion as to the proper use in handling of this material under normal conditions. Any use of the material which is not in conformance with this data sheet or which involves using the material in combination with any other material or any other process is the responsibility of the user.

Instant Mix Epoxy Part A (5 Min)

Material Safety Data Sheet

Revision Number: 001.0

Issue date: 09/17/2012

1. PRODUCT AND COMPANY IDENTIFICATION

Product name: **Loctite Instant Mix Epoxy Part A**
Product type: Epoxy resin

IDH number: 1071291

Region: United States

Company address:
Henkel Corporation
One Henkel Way
Rocky Hill, Connecticut 06067

Contact information:
Telephone: 860.571.5100
Emergency telephone: 860.571.5100MEDICAL EMERGENCY
Phone: Poison Control Center
1-877-671-4608 (toll free) or 1-303-592-1711
TRANSPORT EMERGENCY Phone: CHEMTREC
1-800-424-9300 (toll free) or 1-703-527-3887
Internet: www.henkelna.com

2. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

HMIS:

Physical state: viscous, liquid
Color: clear
Odor: None

HEALTH: 2
FLAMMABILITY: 1
PHYSICAL HAZARD: 0
Personal Protection: See MSDS Section 8

WARNING: MAY CAUSE ALLERGIC SKIN REACTION.
MAY CAUSE EYE, SKIN AND RESPIRATORY TRACT IRRITATION.

Relevant routes of exposure: Skin, Inhalation, Eyes

Potential Health Effects

Inhalation: Mild respiratory tract irritation.
Skin contact: Allergic skin reaction. Moderate skin irritation. Itching. Redness.
Eye contact: Moderate eye irritation. Redness.
Ingestion: Not expected under normal conditions of use.

Existing conditions aggravated by exposure: Skin disorders. Skin allergies.

This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

See Section 11 for additional toxicological information.

3. COMPOSITION / INFORMATION ON INGREDIENTS

Hazardous components	CAS NUMBER	%
Epichlorohydrin-4,4'-isopropylidene diphenol resin	25068-38-6	60 - 100

4. FIRST AID MEASURES

Inhalation: Move to fresh air. If symptoms develop and persist, get medical attention.

Skin contact: Immediately flush skin with plenty of water (using soap, if available). Remove contaminated clothing and footwear. If symptoms develop and persist, get medical attention.

Eye contact: Immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention.

Ingestion: Keep individual calm. DO NOT induce vomiting unless directed to do so by medical personnel. If symptoms develop and persist, get medical attention.

5. FIRE FIGHTING MEASURES

Flash point: > 150 °C (> 302°F) Supplier method

Autoignition temperature: Not available.

Flammable/Explosive limits - lower: Not available.

Flammable/Explosive limits - upper: Not available.

Extinguishing media: Foam, dry chemical or carbon dioxide.

Special firefighting procedures: Wear self-contained breathing apparatus and full protective clothing, such as turn-out gear.

Unusual fire or explosion hazards: In case of fire, keep containers cool with water spray. Closed containers may rupture (due to build up of pressure) when exposed to extreme heat.

Hazardous combustion products: Oxides of carbon. Irritating organic fragments.

6. ACCIDENTAL RELEASE MEASURES

Use personal protection recommended in Section 8, isolate the hazard area and deny entry to unnecessary and unprotected personnel.

Environmental precautions: Do not allow product to enter sewer or waterways.

Clean-up methods: Remove all sources of ignition. Immediately contact emergency personnel. Scrape up as much material as possible. Clean residue with soap and water. Store in a partly filled, closed container until disposal.

7. HANDLING AND STORAGE

Handling: Do not breathe gas/fumes/vapor/spray. Avoid contact with eyes, skin and clothing. Wash thoroughly after handling. Keep container closed.

Storage: Store in original container until ready to use. Keep in a cool, well ventilated area away from heat, sparks and open flame. Keep container tightly closed until ready for use.

For information on product shelf life, please review labels on container or check the Technical Data Sheet.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Employers should complete an assessment of all workplaces to determine the need for, and selection of, proper exposure controls and protective equipment for each task performed.

Hazardous components	ACGIH TLV	OSHA PEL	AIHA WEEL	OTHER
Epichlorohydrin-4,4'-isopropylidene diphenol resin	None	None	None	None

Engineering controls: Provide adequate local exhaust ventilation to maintain worker exposure below exposure limits.

Respiratory protection: Use a NIOSH approved air-purifying respirator if the potential to exceed established exposure limits exists.

Eye/face protection: Safety goggles or safety glasses with side shields.

Skin protection: Chemical resistant, impermeable gloves.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state:	viscous, liquid
Color:	clear
Odor:	None
Odor threshold:	Not available.
pH:	Not applicable
Vapor pressure:	< 0.13 kPa (180 °C (356°F)) Supplier method
Boiling point/range:	> 260.2 °C (> 500.4 °F) > 149 °C (> 300.2 °F)
Melting point/ range:	Not available.
Specific gravity:	1.04
Vapor density:	Not available.
Flash point:	> 150 °C (> 302°F) Supplier method
Flammable/Explosive limits - lower:	Not available.
Flammable/Explosive limits - upper:	Not available.
Autoignition temperature:	Not available.
Evaporation rate:	Not available.
Solubility in water:	low solubility
Partition coefficient (n-octanol/water):	Not available.
VOC content:	0.1 % (value for resin and hardener together)

10. STABILITY AND REACTIVITY

Stability: Stable

Hazardous reactions: Will not occur.

Hazardous decomposition products: None

Incompatible materials: Strong acids. Strong oxidizing agents. Halogenated compounds. Strong mineral acids. Reactive metals. Sodium hypochlorite. Calcium hypochlorite. Nitrous acid and other nitrosating agents.

Conditions to avoid: Excessive heat. Store away from incompatible materials.

11. TOXICOLOGICAL INFORMATION

Hazardous components	NTP Carcinogen	IARC Carcinogen	OSHA Carcinogen (Specifically Regulated)
Epichlorohydrin-4,4'-isopropylidene diphenol resin	No	No	No

Hazardous components	Health Effects/Target Organs
Epichlorohydrin-4,4'-isopropylidene diphenol resin	Allergen, Irritant

12. ECOLOGICAL INFORMATION

Ecological information: Not available.

13. DISPOSAL CONSIDERATIONS

Information provided is for unused product only.

Recommended method of disposal: Follow all local, state, federal and provincial regulations for disposal.

Hazardous waste number: It is the responsibility of the user to determine if an item is hazardous as defined in the Resource Conservation and Recovery Act (RCRA) at the time of disposal. Product uses, transformations, mixtures, processes, etc., may render the resulting material hazardous, under the criteria of ignitability, corrosivity, reactivity and toxicity characteristics of the Toxicity Characteristics Leaching Procedure (TCLP) 40 CFR 261.20-24.

14. TRANSPORT INFORMATION

U.S. Department of Transportation Ground (49 CFR)

Proper shipping name: Not regulated
Hazard class or division: None
Identification number: None
Packing group: None

International Air Transportation (ICAO/IATA)

Proper shipping name: Environmentally hazardous substance, liquid, n.o.s. (Bisphenol-A Epichlorhydrin resin)
Hazard class or division: 9
Identification number: UN 3082
Packing group: III

Water Transportation (IMO/IMDG)

Proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (Bisphenol-A Epichlorhydrin resin)
Hazard class or division: 9
Identification number: UN 3082
Packing group: III

15. REGULATORY INFORMATION

United States Regulatory Information

TSCA 8 (b) Inventory Status: All components are listed or are exempt from listing on the Toxic Substances Control Act Inventory.
TSCA 12(b) Export Notification: None above reporting de minimus

CERCLA/SARA Section 302 EHS: None above reporting de minimis
CERCLA/SARA Section 311/312: Immediate Health, Delayed Health
CERCLA/SARA 313: None above reporting de minimis

California Proposition 65: This product contains a chemical known in the State of California to cause cancer. This product contains a chemical known to the State of California to cause birth defects or other reproductive harm.

Canada Regulatory Information

CEPA DSL/NDSL Status: All components are listed on or are exempt from listing on the Canadian Domestic Substances List.
WHMIS hazard class: D.2.A, D.2.B, E

16. OTHER INFORMATION

This material safety data sheet contains changes from the previous version in sections: New Material Safety Data Sheet format.

Prepared by: Donna Houston, Regulatory Affairs Specialist

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Instant Mix Epoxy Part B (5 Min)

Material Safety Data Sheet

Revision Number: 001.0

Issue date: 09/17/2012

1. PRODUCT AND COMPANY IDENTIFICATION

Product name: Loctite Instant Mix Epoxy Part B
Product type: Not available.

IDH number: 1071250

Region: United States

Company address:
Henkel Corporation
One Henkel Way
Rocky Hill, Connecticut 06067

Contact information:
Telephone: 860.571.5100
MEDICAL EMERGENCY Phone: Poison Control Center
1-877-671-4608 (toll free) or 1-303-592-1711
TRANSPORT EMERGENCY Phone: CHEMTREC
1-800-424-9300 (toll free) or 1-703-527-3887
Internet: www.henkelna.com

2. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

HMIS:

Physical state: liquid
Color: opaque
Odor: amine-like

HEALTH: *3
FLAMMABILITY: 1
PHYSICAL HAZARD: 1
Personal Protection: See MSDS Section 8

DANGER: CAUSES EYE, SKIN AND RESPIRATORY TRACT BURNS.
MAY CAUSE ALLERGIC SKIN AND RESPIRATORY REACTION.
MAY BE HARMFUL IF SWALLOWED OR ABSORBED THROUGH SKIN.

Relevant routes of exposure: Skin, Inhalation, Eyes, Ingestion

Potential Health Effects

Inhalation: Allergic respiratory reaction. May cause respiratory tract irritation. May cause irritation to nose and throat. Lung damage. Respiratory tract burns.

Skin contact: May cause skin burns. Allergic skin reaction. Harmful if absorbed through skin. Rash. Redness. Tissue damage.

Eye contact: Burns. Severe eye irritation. Redness. Tissue damage.

Ingestion: May be harmful if swallowed. May cause burns of mouth and throat if swallowed.

Existing conditions aggravated by exposure: Skin disorders. Skin allergies. Respiratory disorders. Eye disorders. Asthma.

This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

See Section 11 for additional toxicological information.

3. COMPOSITION / INFORMATION ON INGREDIENTS

Hazardous components	CAS NUMBER	%
1,3-bis[3-(dimethylamino)propyl]urea	52338-87-1	10 - 30
Poly[oxy(methyl-1,2-ethanediyl)], a-hydro-w-hydroxy-, ether with 2,2-bis(hydroxymethyl)-1,3-propanediol (4:1), 2-hydroxy-3-mercaptop	72244-98-5	60 - 100

4. FIRST AID MEASURES

Inhalation: Move to fresh air. If breathing is difficult, give oxygen. If not breathing, give artificial respiration. Get medical attention.

Skin contact: Remove contaminated clothing and footwear. Immediately flush skin with plenty of water (using soap, if available). Thoroughly clean shoes before reuse. Wash clothing before reuse. If symptoms develop and persist, get medical attention.

Eye contact: Immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention.

Ingestion: DO NOT induce vomiting unless directed to do so by medical personnel. Keep individual calm. Get immediate medical attention.

5. FIRE FIGHTING MEASURES

Flash point: 257 °C (494.6 °F) Supplier method

Autoignition temperature: Not available.

Flammable/Explosive limits - lower: Not available.

Flammable/Explosive limits - upper: Not available.

Extinguishing media: Water spray (fog), foam, dry chemical or carbon dioxide.

Special firefighting procedures: Wear self-contained breathing apparatus and full protective clothing, such as turn-out gear.

Unusual fire or explosion hazards: In case of fire, keep containers cool with water spray.

Hazardous combustion products: Oxides of carbon. Oxides of nitrogen. Ammonia. Amines. Nitric acid. Nitrosamines. Irritating organic fragments.

6. ACCIDENTAL RELEASE MEASURES

Use personal protection recommended in Section 8, isolate the hazard area and deny entry to unnecessary and unprotected personnel.

Environmental precautions: Do not allow product to enter sewer or waterways.

Clean-up methods: Remove all sources of ignition. Immediately contact emergency personnel. Scrape up as much material as possible. Clean residue with soap and water. Store in a partly filled, closed container until disposal.

7. HANDLING AND STORAGE

Handling: Keep away from heat, spark and flame. Do not breathe gas/fumes/vapor/spray. Avoid contact with eyes, skin and clothing. Keep container closed. Wash thoroughly after handling.

Storage: Store in original container until ready to use. Keep in a cool, well ventilated area away from heat, sparks and open flame. Keep container tightly closed until ready for use.

For information on product shelf life, please review labels on container or check the Technical Data Sheet.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Employers should complete an assessment of all workplaces to determine the need for, and selection of, proper exposure controls and protective equipment for each task performed.

Hazardous components	ACGIH TLV	OSHA PEL	AIHA WEEL	OTHER
1,3-bis[3-(dimethylamino)propyl]urea	None	None	None	None
Poly[oxy(methyl-1,2-ethanediyl)], a-hydro-w-hydroxy-, ether with 2,2-bis(hydroxymethyl)-1,3-propanediol (4:1), 2-hydroxy-3-mercaptop	None	None	None	None

Engineering controls: Use local exhaust ventilation if the potential for airborne exposure exists.

Respiratory protection: Use a NIOSH approved air-purifying respirator if the potential to exceed established exposure limits exists.

Eye/face protection: Safety goggles or safety glasses with side shields.

Skin protection: Use chemical resistant, impermeable clothing including gloves and either an apron or body suit to prevent skin contact.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state: liquid
Color: opaque
Odor: amine-like
Odor threshold: Not available.
pH: Not available.
Vapor pressure: Not available.
Boiling point/range: > 149 °C (> 300.2 °F)
Melting point/ range: Not available.
Specific gravity: 1.1000
Vapor density: Not available.
Flash point: 257 °C (494.6 °F) Supplier method
Flammable/Explosive limits - lower: Not available.
Flammable/Explosive limits - upper: Not available.
Autoignition temperature: Not available.
Evaporation rate: Not available.
Solubility in water: Dispersible
Partition coefficient (n-octanol/water): Not available.
VOC content: 0.1 % (value for resin and hardener together)

10. STABILITY AND REACTIVITY

Stability: Stable

Hazardous reactions: Will not occur.

Hazardous decomposition products: None

Incompatible materials: Strong acids. Strong oxidizing agents. Halogenated compounds. Strong mineral acids. Reactive metals. Sodium hypochlorite. Calcium hypochlorite. Nitrous acid and other nitrosating agents.

Conditions to avoid: Excessive heat. Store away from incompatible materials.

11. TOXICOLOGICAL INFORMATION

Hazardous components	NTP Carcinogen	IARC Carcinogen	OSHA Carcinogen (Specifically Regulated)
1,3-bis[3-(dimethylamino)propyl]urea	No	No	No
Poly[oxy(methyl-1,2-ethanediyl)], a-hydro-w-hydroxy-, ether with 2,2-bis(hydroxymethyl)-1,3-propanediol (4:1), 2-hydroxy-3-mercaptop	No	No	No

Hazardous components	Health Effects/Target Organs
1,3-bis[3-(dimethylamino)propyl]urea	No Target Organs
Poly[oxy(methyl-1,2-ethanediyl)], a-hydro-w-hydroxy-, ether with 2,2-bis(hydroxymethyl)-1,3-propanediol (4:1), 2-hydroxy-3-mercaptop	No Records

12. ECOLOGICAL INFORMATION

Ecological information: Not available.

13. DISPOSAL CONSIDERATIONS

Information provided is for unused product only.

Recommended method of disposal: Follow all local, state, federal and provincial regulations for disposal.

Hazardous waste number: It is the responsibility of the user to determine if an item is hazardous as defined in the Resource Conservation and Recovery Act (RCRA) at the time of disposal. Product uses, transformations, mixtures, processes, etc., may render the resulting material hazardous, under the criteria of ignitability, corrosivity, reactivity and toxicity characteristics of the Toxicity Characteristics Leaching Procedure (TCLP) 40 CFR 261.20-24.

14. TRANSPORT INFORMATION

U.S. Department of Transportation Ground (49 CFR)

Proper shipping name: Not regulated
Hazard class or division: None
Identification number: None
Packing group: None

International Air Transportation (ICAO/IATA)

Proper shipping name: Not regulated
Hazard class or division: None
Identification number: None
Packing group: None

Water Transportation (IMO/IMDG)

Proper shipping name: Not regulated
Hazard class or division: None
Identification number: None
Packing group: None

15. REGULATORY INFORMATION

United States Regulatory Information

TSCA 8 (b) Inventory Status: All components are listed or are exempt from listing on the Toxic Substances Control Act Inventory.
TSCA 12(b) Export Notification: None above reporting de minimus

CERCLA/SARA Section 302 EHS: None above reporting de minimis
CERCLA/SARA Section 311/312: Immediate Health, Delayed Health
CERCLA/SARA 313: None above reporting de minimis

California Proposition 65: No California Proposition 65 listed chemicals are known to be present.

Canada Regulatory Information

CEPA DSL/NDSL Status: All components are listed on or are exempt from listing on the Canadian Domestic Substances List.
WHMIS hazard class: D.2.A, D.2.B, E

16. OTHER INFORMATION

This material safety data sheet contains changes from the previous version in sections: New Material Safety Data Sheet format.

Prepared by: Donna Houston, Regulatory Affairs Specialist

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Isopropyl Alcohol (IPA)

Material Safety Data Sheet
Isopropyl alcohol MSDS

Section 1: Chemical Product and Company Identification

Product Name: Isopropyl alcohol

Catalog Codes: SLI1153, SLI1579, SLI1906, SLI1246, SLI1432

CAS#: 67-63-0

RTECS: NT8050000

TSCA: TSCA 8(b) inventory: Isopropyl alcohol

CI#: Not available.

Synonym: 2-Propanol

Chemical Name: isopropanol

Chemical Formula: C3-H8-O

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call: 1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Isopropyl alcohol	67-63-0	100

Toxicological Data on Ingredients: Isopropyl alcohol: ORAL (LD50): Acute: 5045 mg/kg [Rat]. 3600 mg/kg [Mouse]. 6410 mg/kg [Rabbit]. DERMAL (LD50): Acute: 12800 mg/kg [Rabbit].

Section 3: Hazards Identification

Potential Acute Health Effects:
Hazardous in case of eye contact (irritant), of ingestion, of inhalation. Slightly hazardous in case of skin contact (irritant, sensitizer, permeator).

Potential Chronic Health Effects:
Slightly hazardous in case of skin contact (sensitizer). CARCINOGENIC EFFECTS: A4 (Not classifiable for human or animal.) by ACGIH, 3 (Not classifiable for human.) by IARC. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Classified Reproductive system/toxin/female, Development toxin [POSSIBLE]. The substance may be toxic to kidneys, liver, skin, central nervous system (CNS). Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

p. 1

Eye Contact:
Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Cold water may be used. Get medical attention.

Skin Contact:
Wash with soap and water. Cover the irritated skin with an emollient. Get medical attention if irritation develops. Cold water may be used.

Serious Skin Contact: Not available.

Inhalation:
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention if symptoms appear.

Serious Inhalation:
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

Ingestion:
Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention if symptoms appear.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Flammable.

Auto-Ignition Temperature: 399°C (750.2°F)

Flash Points: CLOSED CUP: 11.667°C (53°F) - 12.778 deg. C (55 deg. F) (TAG)

Flammable Limits: LOWER: 2% UPPER: 12.7%

Products of Combustion: These products are carbon oxides (CO, CO2).

Fire Hazards in Presence of Various Substances:
Highly flammable in presence of open flames and sparks, of heat. Flammable in presence of oxidizing materials. Non-flammable in presence of shocks.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available. Explosive in presence of open flames and sparks, of heat.

Fire Fighting Media and Instructions:
Flammable liquid, soluble or dispersed in water. SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use alcohol foam, water spray or fog.

Special Remarks on Fire Hazards:
Vapor may travel considerable distance to source of ignition and flash back. CAUTION: MAY BURN WITH NEAR INVISIBLE FLAME. Hydrogen peroxide sharply reduces the autoignition temperature of Isopropyl alcohol. After a delay, Isopropyl alcohol ignites on contact with dioxgenyl tetrafluorborate, chromium trioxide, and potassium tert-butoxide. When heated to decomposition it emits acrid smoke and fumes.

Special Remarks on Explosion Hazards:
Secondary alcohols are readily autooxidized in contact with oxygen or air, forming ketones and hydrogen peroxide. It can become potentially explosive. It reacts with oxygen to form dangerously unstable peroxides which can concentrate and explode during distillation or evaporation. The presence of 2-butanone increases the reaction rate for peroxide formation. Explosive in the form of vapor when exposed to heat or flame. May form explosive mixtures with air. Isopropyl alcohol + phosgene forms isopropyl chloroformate and hydrogen chloride. In the presence of iron salts, thermal decompositon can occur, whicn in some cases can become explosive. A homogeneous mixture of concentrated peroxides + isopropyl alcohol are capable of detonation by shock or heat. Barium perchlorate + isopropyl alcohol gives the highly explosive alkyl perchlorates.

It forms explosive mixtures with trinitormethane and hydrogen peroxide. It produces a violent explosive reaction when heated with aluminum isopropoxide + crotonaldehyde. Mixtures of isopropyl alcohol + nitroform are explosive.

Section 6: Accidental Release Measures

Small Spill:
Dilute with water and mop up, or absorb with an inert dry material and place in an appropriate waste disposal container.

Large Spill:
Flammable liquid. Keep away from heat. Keep away from sources of ignition. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not touch spilled material. Prevent entry into sewers, basements or confined areas; dike if needed. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapor/spray. Avoid contact with eyes. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Keep away from incompatibles such as oxidizing agents, acids.

Storage:
Store in a segregated and approved area. Keep container in a cool, well-ventilated area. Keep container tightly closed and sealed until ready for use. Avoid all possible sources of ignition (spark or flame).

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection:
Splash goggles. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:
TWA: 983 STEL: 1230 (mg/m3) [Australia] TWA: 200 STEL: 400 (ppm) from ACGIH (TLV) [United States] [1999] TWA: 980 STEL: 1225 (mg/m3) from NIOSH TWA: 400 STEL: 500 (ppm) from NIOSH TWA: 400 STEL: 500 (ppm) [United Kingdom (UK)] TWA: 999 STEL: 1259 (mg/m3) [United Kingdom (UK)] TWA: 400 STEL: 500 (ppm) from OSHA (PEL) [United States] TWA: 980 STEL: 1225 (mg/m3) from OSHA (PEL) [United States]Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor:
Pleasant. Odor resembling that of a mixture of ethanol and acetone.

Taste: Bitter. (Slight.)

Molecular Weight: 60.1 g/mole

Color: Colorless.

pH (1% soln/water): Not available.

Boiling Point: 82.5°C (180.5°F)

Melting Point: -88.5°C (-127.3°F)

Critical Temperature: 235°C (455°F)

Specific Gravity: 0.78505 (Water = 1)

Vapor Pressure: 4.4 kPa (@ 20°C)

Vapor Density: 2.07 (Air = 1)

Volatility: Not available.

Odor Threshold:
22 ppm (Sittig, 1991) 700 ppm for unadapted panelists (Verschuren, 1983).

Water/Oil Dist. Coeff.: The product is equally soluble in oil and water; log(oil/water) = 0.1

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water, methanol, diethyl ether, n-octanol, acetone.

Solubility:
Easily soluble in cold water, hot water, methanol, diethyl ether, n-octanol, acetone. Insoluble in salt solution. Soluble in benzene. Miscible with most organic solvents including alcohol, ethyl alcohol, chloroform.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Heat, Ignition sources, incompatible materials

Incompatibility with various substances: Reactive with oxidizing agents, acids, alkalis.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity:
Reacts violently with hydrogen + palladium combination, nitroform, oleum, COCl2, aluminum triisopropoxide, oxidants Incompatible with acetaldehyde, chlorine, ethylene oxide, isocyanates, acids, alkaline earth, alkali metals, caustics, amines, crotonaldehyde, phosgene, ammonia. Isopropyl alcohol reacts with metallic aluminum at high temperatures. Isopropyl alcohol attacks some plastics, rubber, and coatings. Vigorous reaction with sodium dichromate + sulfuric acid.

Special Remarks on Corrosivity: May attack some forms of plastic, rubber and coating

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Dermal contact. Eye contact. Inhalation.

Toxicity to Animals:
WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE. Acute oral toxicity (LD50): 3600 mg/kg [Mouse]. Acute dermal toxicity (LD50): 12800 mg/kg [Rabbit]. Acute toxicity of the vapor (LC50): 16000 8 hours [Rat].

Chronic Effects on Humans:
CARCINOGENIC EFFECTS: A4 (Not classifiable for human or animal.) by ACGIH, 3 (Not classifiable for human.) by IARC. DEVELOPMENTAL TOXICITY: Classified Reproductive system/toxin/female, Development toxin [POSSIBLE]. May cause damage to the following organs: kidneys, liver, skin, central nervous system (CNS).

Other Toxic Effects on Humans:
Hazardous in case of ingestion, of inhalation. Slightly hazardous in case of skin contact (irritant, sensitizer, permeator).

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans:
May cause adverse reproductive/teratogenic effects (fertility, fetoxicity, developmental abnormalities (developmental toxin)) based on animal studies. Detected in maternal milk in human.

Special Remarks on other Toxic Effects on Humans:
Acute Potential Health Effects: Skin: May cause mild skin irritation, and sensitization. Eyes: Can cause eye irritation. Inhalation: Breathing in small amounts of this material during normal handling is not likely to cause harmful effects. However, breathing large amounts may be harmful and may affect the respiratory system and mucous membranes (irritation), behavior and brain (Central nervous system depression - headache, dizziness, drowsiness, stupor, incoordination, unconciousness, coma and possible death), peripheral nerve and senstation, blood, urinary system, and liver. Ingestion: Swallowing small amouts during normal handling is not likely to cause harmful effects. Swallowing large amounts may be harmful. Swallowing large amounts may cause gastrointestinal tract irritation with nausea, vomiting and diarrhea, abdominal pain. It also may affect the urinary system, cardiovascular system, sense organs, behavior or central nervous system (somnolence, generally depressed activity, irritability, headache, dizziness, drowsiness), liver, and respiratory system (breathing difficulty). Chronic Potential Health Effects: May cause defatting of the skin and dermatitis and allergic reaction. May cause adverse reproductive effects based on animal data (studies).

Section 12: Ecological Information

Ecotoxicity: Ecotoxicity in water (LC50): 100000 mg/l 96 hours [Fathead Minnow]. 64000 mg/l 96 hours [Fathead Minnow].

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The product itself and its products of degradation are not toxic.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:
Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: CLASS 3: Flammable liquid.

Identification: : Isopropyl Alcohol UNNA: 1219 PG: II

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:
Connecticut hazardous material survey.: Isopropyl alcohol Illinois toxic substances disclosure to employee act: Isopropyl alcohol Rhode Island RTK hazardous substances: Isopropyl alcohol Pennsylvania RTK: Isopropyl alcohol Florida: Isopropyl alcohol Minnesota: Isopropyl alcohol Massachusetts RTK: Isopropyl alcohol New Jersey: Isopropyl alcohol New Jersey spill list: Isopropyl alcohol Director's list of Hazardous Substances: Isopropyl alcohol Tennesee: Isopropyl alcohol TSCA 8(b) inventory: Isopropyl alcohol TSCA 4(a) final testing order: Isopropyl alcohol TSCA 8(a) IUR: Isopropyl alcohol TSCA 8(d) H

and S data reporting: Isopropyl alcohol: Effective date: 12/15/86 Sunset Date: 12/15/96 TSCA 12(b) one time export: Isopropyl alcohol SARA 313 toxic chemical notification and release reporting: Isopropyl alcohol

Other Regulations:
OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada):
CLASS B-2: Flammable liquid with a flash point lower than 37.8°C (100°F). CLASS D-2B: Material causing other toxic effects (TOXIC).

DSCL (EEC):
R11- Highly flammable. R36- Irritating to eyes. S7- Keep container tightly closed. S16- Keep away from sources of ignition - No smoking. S24/25- Avoid contact with skin and eyes. S26- In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 3

Reactivity: 0

Personal Protection: h

National Fire Protection Association (U.S.A.):

Health: 1

Flammability: 3

Reactivity: 0

Specific hazard:

Protective Equipment:
Gloves. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

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Last Updated: 05/21/2013 12:00 PM

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Krylon Spray Paint

00 — Section 1 —
Product Identification

Material Safety Data Sheet

The Sherwin-Williams Company
Krylon Products Group
101 Prospect Avenue N.W.
Cleveland, OH 44115

Emergency telephone numbers (216) 566-2917 United States

Information telephone number (800) 251-2486
July 24, 2000

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KRYLON® PAINT ALL® Fast Dry Enamel - 1

PAINTALL1/KRI

— Section 2 —

CAS No.	Hazardous Ingredients (percent by weight)	ACGIH TLV <STEL>	OSHA PEL <STEL>	Units	Vapor Pressure (mm Hg)	S04101 Flat White	S04102 Flat Black	S04103 Red	S04104 Yellow	S04105 Blue	S04106 Green	S04107 Orange	S04108 Brown
74-98-6	Propane	2500	1000	PPM	760.0	14	14	14	14	14	14	14	14
106-97-8	Butane	800	800	PPM	760.0	13	13	13	13	13	13	13	13
100-41-4 §	Ethylbenzene	100 <125>	100 <125>	PPM	7.1	3	2	3	3	4	3	3	3
1330-20-7 §	Xylene.	100 <150>	100 <150>	PPM	5.9	15	13	18	19	23	18	18	18
67-64-1	Acetone.	500 <750>	1000	PPM	180.0	42	47	39	37	26	39	39	39
14807-96-6	Talc	2	2	Mg/M3	as Resp. Dust	4	4						
471-34-1	Calcium Carbonate.	10	15[5]	Mg/M3 [Resp.	as Dust Fraction]		1						
13463-67-7	Titanium Dioxide.	10	10[5]	Mg/M3 [Resp.	as Dust Fraction]	3			2	3			
1333-86-4	Carbon Black.	3.5	3.5	Mg/M3			0.2						0.2
	Weight per Gallon (lbs.)					6.33	6.17	6.13	6.22	6.38	6.16	6.11	6.16
	VOC Less Federally Exempt Solvents - (percent by weight)					44.4	43.2	49.1	49.6	54.8	48.7	48.6	48.8
	Flash Point (°F)					< 0	< 0	< 0	< 0	< 0	< 0	< 0	< 0
	HMIS (NFPA) Rating (health - flammability - reactivity)					2 - 4 - 0	2* - 4 - 0	2 - 4 - 0	2 - 4 - 0	2 - 4 - 0	2 - 4 - 0	2 - 4 - 0	2* - 4 - 0

% BY WEIGHT

§ Ingredient subject to the reporting requirements of the Superfund Amendments and Reauthorization Act (SARA) Section 313, 40 CFR 372.65 C

→→→ *MSDS Text Page Follows* →→→

Section 3 — Physical Data

PRODUCT WEIGHT	See TABLE	EVAPORATION RATE	Faster than Ether
SPECIFIC GRAVITY	0.73-0.79	VAPOR DENSITY	Heavier than Air
BOILING RANGE	<0 - 395 °F	MELTING POINT	N.A.
VOLATILE VOLUME	87-95 %	SOLUBILITY IN WATER	N.A.

Section 4 — Fire And Explosion Hazard Data

FLASH POINT
See TABLE — *LEL* 1.0 *UEL* 12.8

EXTINGUISHING MEDIA
Carbon Dioxide, Dry Chemical, Foam

UNUSUAL FIRE AND EXPLOSION HAZARDS
Isolate from heat, electrical equipment, sparks, and open flame. Closed containers may explode when exposed to extreme heat. Application to hot surfaces requires special precautions. During emergency conditions overexposure to decomposition products may cause a health hazard. Symptoms may not be immediately apparent. Obtain medical attention.

SPECIAL FIRE FIGHTING PROCEDURES
Full protective equipment including self-contained breathing apparatus should be used. Water spray may be ineffective. If water is used, fog nozzles are preferable. Water may be used to cool closed containers to prevent pressure build-up and possible autoignition or explosion when exposed to extreme heat.

Section 5 — Health Hazard Data

ROUTES OF EXPOSURE
Exposure may be by INHALATION and/or SKIN or EYE contact, depending on conditions of use. To minimize exposure, follow recommandations for proper use, ventilation, and personal protective equipment.

ACUTE Health Hazards

EFFECTS OF OVEREXPOSURE
Irritation of eyes, skin and respiratory system. May cause nervous system depression. Extreme overexposure may result in unconsciousness and possibly death.

SIGNS AND SYMPTOMS OF OVEREXPOSURE
Headache, dizziness, nausea, and loss of coordination are indications of excessive exposure to vapors or spray mists.
Redness and itching or burning sensation may indicate eye or excessive skin exposure.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE
None generally recognized.

EMERGENCY AND FIRST AID PROCEDURES
If INHALED: If affected, remove from exposure. Restore breathing. Keep warm and quiet.
If on SKIN: Wash affected area thoroughly with soap and water. Remove contaminated clothing and launder before re-use.
If in EYES: Flush eyes with large amounts of water for 15 minutes. Get medical attention.
If SWALLOWED: Never give anything by mouth to an unconscious person. DO NOT INDUCE VOMITING. Give conscious patient several glasses of water. Seek medical attention.

CHRONIC Health Hazards
Carbon Black is classified by IARC as possibly carcinogenic to humans (Group 2B) based on experimental animals data, however, there is inadequate evidence in humans for its carcinogenicity.
Prolonged overexposure to solvent ingredients in Section 2 may cause adverse effects to the liver, urinary, cardiovascular and reproductive systems.
Rats exposed to titanium dioxide dust at 250 mg./m3 developed lung cancer, however, such exposure levels are not attainable in the workplace.
Reports have associated repeated and prolonged overexposure to solvents with permanent brain and nervous system damage.

Section 6 — Reactivity Data

STABILITY — Stable
CONDITIONS TO AVOID — None known.
INCOMPATIBILITY — None known.
HAZARDOUS DECOMPOSITION PRODUCTS — By fire: Carbon Dioxide, Carbon Monoxide, Oxides of Metals in Section 2
HAZARDOUS POLYMERIZATION — Will Not Occur

Section 7 — Spill Or Leak Procedures

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED
Remove all sources of ignition. Ventilate and remove with inert absorbent.

WASTE DISPOSAL METHOD
Waste from these products may be hazardous as defined under the Resource Conservation and Recovery Act (RCRA) 40 CFR 261. Waste must be tested for ignitability to determine the applicable EPA hazardous waste numbers. Waste from products containing Barium must also be tested for extractability.
Do not incinerate. Depressurize container. Dispose of in accordance with Federal, State, and Local regulations regarding pollution.

Section 8 — Protection Information

PRECAUTIONS TO BE TAKEN IN USE
Use only with adequate ventilation. Avoid breathing vapor and spray mist. Avoid contact with skin and eyes. Wash hands after using.
These products may contain materials classified as nuisance particulates (listed "as Dust" in Section 2) which may be present at hazardous levels only during sanding or abrading of the dried film. If no specific dusts are listed in Section 2, the applicable limits for nuisance dusts are ACGIH TLV 10 mg./m3 (total dust), 3 mg./m3 (respirable fraction), OSHA PEL 15 mg./m3 (total dust), 5 mg./m3 (respirable fraction).

VENTILATION
Local exhaust preferable. General exhaust acceptable if the exposure to materials in Section 2 is maintained below applicable exposure limits. Refer to OSHA Standards 1910.94, 1910.107, 1910.108.

RESPIRATORY PROTECTION
If personal exposure cannot be controlled below applicable limits by ventilation, wear a properly fitted organic vapor/particulate respirator approved by NIOSH/MSHA for protection against materials in Section 2.
When sanding or abrading the dried film, wear a dust/mist respirator approved by NIOSH/MSHA for dust which may be generated from this product, underlying paint, or the abrasive.

PROTECTIVE GLOVES
None required for normal application of aerosol products where minimal skin contact is expected. For long or repeated contact, wear chemical resistant gloves.

EYE PROTECTION
Wear safety spectacles with unperforated sideshields.

Section 9 — Precautions

DOL STORAGE CATEGORY — 1A

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING
Keep away from heat, sparks, and open flame. Vapors will accumulate readily and may ignite explosively.
During use and until all vapors are gone: Keep area ventilated - Do not smoke - Extinguish all flames, pilot lights, and heaters - Turn off stoves, electric tools and appliances, and any other sources of ignition.
Consult NFPA Code. Use approved Bonding and Grounding procedures.
Contents under pressure. Do not puncture, incinerate, or expose to temperature above 120F. Heat from sunlight, radiators, stoves, hot water, and other heat sources could cause container to burst. Do not take internally. Keep out of the reach of children.

OTHER PRECAUTIONS
Intentional misuse by deliberately concentrating and inhaling the contents can be harmful or fatal.

Section 10 — Other Regulatory Information

CALIFORNIA PROPOSITION 65
WARNING: These products contain chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

TSCA CERTIFICATION
All chemicals in these products are listed, or are exempt from listing, on the TSCA Inventory.

The above information pertains to these products as currently formulated, and is based on the information available at this time. Addition of reducers or other additives to these products may substantially alter the composition and hazards of the product. Since conditions of use are outside our control, we make no warranties, express or implied, and assume no liability in connection with any use of this information.

00 — Section 1 —
Product Identification

Material Safety Data Sheet

The Sherwin-Williams Company
Krylon Products Group
101 Prospect Avenue N.W.
Cleveland, OH 44115

Emergency telephone numbers (216) 566-2917 United States

Information telephone number (800) 251-2486
July 24, 2000

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KRYLON® PAINT ALL® Fast Dry Enamel - 2 — *PAINTALL2/KRI*

CAS No.	— Section 2 — Hazardous Ingredients (percent by weight)	ACGIH TLV <STEL>	OSHA PEL <STEL>	Units	Vapor Pressure (mm Hg)	S04109 Pink	S04110 Chrome Aluminum	S04113 Gloss White	S04114 Gloss Black	S04115 Gray	S04116 Cherry Red	S04120 Red Oxide Primer
74-98-6	Propane	2500	1000	PPM	760.0	14	16	14	14	14	14	14
106-97-8	Butane	800	800	PPM	760.0	13	16	13	13	13	13	13
64742-88-7	Mineral Spirits.	100	100	PPM	2.0		1					2
108-88-3 §	Toluene.	50	100 <150>	PPM (Skin)	22.0	3	37					
100-41-4 §	Ethylbenzene	100 <125>	100 <125>	PPM	7.1	3		3	3	3	3	3
1330-20-7 §	Xylene.	100 <150>	100 <150>	PPM	5.9	20	4	16	15	16	19	18
67-64-1	Acetone.	500 <750>	1000	PPM	180.0	27	5	39	47	42	39	30
14807-96-6	Talc	2	2	Mg/M3	as Resp. Dust							3
7727-43-7	Barium Sulfate.	10	10[5]	Mg/M3 [Resp.	as Dust Fraction]							5
13463-67-7	Titanium Dioxide.	10	10[5]	Mg/M3 [Resp.	as Dust Fraction]	5		6		3		
1333-86-4	Carbon Black.	3.5	3.5	Mg/M3					0.3			
	[% Barium]											[3.0]
	Weight per Gallon (lbs.)					6.44	6.25	6.34	6.03	6.19	6.12	6.59
	VOC Less Federally Exempt Solvents - (percent by weight)					53.6	75.3	45.8	44.7	46.5	49.9	50.5
	Flash Point (°F)					< 0	< 0	< 0	< 0	< 0	< 0	< 0
	HMIS (NFPA) Rating (health - flammability - reactivity)					2 - 4 - 0	2 - 4 - 1	2 - 4 - 0	2* - 4 - 0	2 - 4 - 0	2 - 4 - 0	2 - 4 - 0

PERCENT BY WEIGHT

§ Ingredient subject to the reporting requirements of the Superfund Amendments and Reauthorization Act (SARA) Section 313, 40 CFR 372.65 C

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Redness and itching or burning sensation may indicate eye or excessive skin exposure.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE
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Keep away from heat, sparks, and open flame. Vapors will accumulate readily and may ignite explosively.
During use and until all vapors are gone: Keep area ventilated - Do not smoke - Extinguish all flames, pilot lights, and heaters - Turn off stoves, electric tools and appliances, and any other sources of ignition.
Consult NFPA Code. Use approved Bonding and Grounding procedures.
Contents under pressure. Do not puncture, incinerate, or expose to temperature above 120F. Heat from sunlight, radiators, stoves, hot water, and other heat sources could cause container to burst. Do not take internally. Keep out of the reach of children.

OTHER PRECAUTIONS
Intentional misuse by deliberately concentrating and inhaling the contents can be harmful or fatal.

Section 10 — Other Regulatory Information

CALIFORNIA PROPOSITION 65
WARNING: These products contain chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

TSCA CERTIFICATION
All chemicals in these products are listed, or are exempt from listing, on the TSCA Inventory.

The above information pertains to these products as currently formulated, and is based on the information available at this time. Addition of reducers or other additives to these products may substantially alter the composition and hazards of the product. Since conditions of use are outside our control, we make no warranties, express or implied, and assume no liability in connection with any use of this information.

Lithium Polymer Battery

Ascent Battery Supply, LLC
925 Walnut Ridge Drive
Hartland, Wisconsin 53029

Material Safety Data Sheet — Lithium Polymer

The information and recommendations below are believed to be accurate at the date of preparation. Ascent Battery Supply makes no warranty of merchantability or any other warranty, express or implied, with respect to such information and we assume no liability resulting from its use. This MSDS provides guidelines for safe use and handling of the product. It does not and cannot advise all possible situations. Your specific use of this product should be evaluated to determine if additional precautions must be taken.

Distributed By	Ascent Battery Supply, LLC	**Emergency Number**	INFOTRAC (800) 535-5053
Address	Ascent Battery Supply 925 Walnut Ridge Drive Hartland, Wisconsin 53029	**Overseas Emergency Number**	INFOTRAC (352) 323-3500 (Collect)
Revision Date	April/2011		

SECTION 1 – IDENTITY

Product Name	Rayovac Lithium Polymer Battery
Common Synonyms	Li-Poly, Li-Polymer
DOT Description	Dry Battery
Chemical Name	Lithiated Cobalt Oxide

SECTION 2 – HAZARDOUS INGREDIENTS

Chemical Name	CAS No.	Percentage %
Lithium Cobalt Oxide	12190-79-3	25-50
Carbon	n/a	10-30
Aluminum	7429-90-5	2-10
Nickel	n/a	0.5-5
Polyvinylidene Fluoride (PVDF)	n/a	0-5
Aluminum Packing Foil	n/a	5-15
Copper	7440-50-8	5-15
Organic Solvents	n/a	10-20

SECTION 3 – PHYSICAL AND CHEMICAL CHARACTERISTICS

Boiling Point	NA	**Melting Point**	NA
Vapor Pressure	NA	**Vapor Density**	NA
Specific Gravity	NA	**Percent Volatile By Volume**	NA
Solubility in Water	NA	**Reactivity in Water**	NA
Appearance and Odor	Geometric, solid object	**Evaporation Rate**	NA
Flash Point	NA	**Flammable Limits in Air % by Volume**	NA
Extinguisher Media	CO2, Dry chemical.	**Auto-Ignition Temperature**	NA
Special Fire Fighting Procedures	Use a positive pressure self-contained breathing apparatus if batteries are involved in a fire. Full protective clothing is necessary.		
Unusual Fire and Explosion Hazards	Cells or batteries may flame or leak potentially hazardous organic vapors if exposed to excessive heat or fire. Damaged or opened cells or batteries can result in rapid heating and the release of flammable vapors. Vapors may be heavier than air and may travel along the ground or be moved by ventilation to an ignition source and flash back. Possible formation of hydrogen fluoride (HF) and phosphorous oxides during fire. LiPF6 salt contained in the electrolyte releases hydrogen fluoride (HF) in contact with water. During water application, caution is advised as burning pieces of flammable particles may be ejected from the fire.		

SECTION 4 – PHYSICAL HAZARDS

Stable or Unstable	Stable	**Conditions to Avoid**	Heat above 70°C or incinerate. Do not deform, mutilate, crush, pierce, or disassemble. Do not short circuit or expose to humid conditions.

Incompatibility (Materials to Avoid)	NA
Hazardous Decomposition Products	Corrosive/Irritant Hydrogen fluoride (HF) is produced in case of reaction of *lithium hexafluorophosphate (LiPF6)* with water. Combustible vapors and formation of Hydrogen fluoride (HF) and phosphorous oxides during fire. .

SECTION 5 – HEALTH HAZARDS

Threshold Limit Value	NA
Signs and Symptoms of Exposure	Following cell overheating due to external source or due to improper use, electrolyte leakage or battery container rupture may occur and release inner component/material in the environment. Electrolyte solution contained in the battery causes ocular tissue and skin irritation. Ingestion of electrolyte solution causes tissue damage to throat and gastro/respiratory tract. Contents of a leaking or ruptured battery can cause respiratory tract, mucus, membrane irritation and edema.
Medical Conditions Generally Caused by Exposure	The materials contained in this battery may only represent a hazard if the integrity of the battery is compromised or if the battery is physically or electrically abused. **Acute exposure**: Electrolyte may irritate skin and eyes.
Routes of Entry	Skin, eyes, swallowing, and inhalation
Emergency and First Aid Procedures for	
1. Inhalation	Get fresh air. If symptoms persist seek medical attention
2. Eyes and Skin	If a cell ruptures, flush with copious quatities of flowing lukewarm water for a minimum of 15 minutes. Get immediate medical attention for eyes. Wash skin with soap and water.
4. Ingestion	Ingestion of battery chemicals can be harmful. Call The National Battery Ingestion Hotline (202-625-3333) 24 hours a day, for procedures treating ingestion of chemicals. Do not induce vomiting.

SECTION 6 – SPECIAL PROTECTION INFORMATION

Respiratory Protection	In case of battery rupture, use self-contained full-face respiratory equipment				
Ventilation	N/A	**Local Exhaust**	NA	**Mechanical** (General)	NA
Gloves	Use Viton rubber gloves if handling a leaking or ruptured battery	**Safety Glasses**	Wear safety goggles or glasses with side shields if handling a leaking or ruptured battery.		
Other Protective Equipment	Use self-contained breathing apparatus to avoid breathing irritant fumes. Wear protective clothing and equipment to prevent body contact with electrolyte solution.				

SECTION 7 – SPECIAL PRECAUTIONS – SPILL AND LEAKAGE PROCEDURES

Precautions to be Taken when Handling and Storing	Batteries are designed to be recharged. However, improperly charging a cell or battery may cause the cell or battery to flame. Use only approved chargers and procedures. Never disassemble a battery or bypass any safety device. Should a battery unintentionally be crushed, thus releasing its contents, rubber gloves must be used to handle all battery components. Avoid inhalation of any vapors that may be emitted.
Other Precautions	Do not store batteries above 60 °C or below -32°C. Store batteries in a cool (below 21°C (70°F)), dry area that is subject to little temperature change. Elevated temperatures can result in reduced battery service life. Battery exposure to temperatures in excess of 130°C will result in the battery

	venting flammable liquid and gases. Do not store batteries in a manner that allows terminals to short circuit.
Steps to be Taken if chemicals are spilled	If cells are leaking or rupture, prevent skin and eye contact and collect all released material in a plastic lined metal container. Personal protective equipment for damaged batteries should include chemical resistant gloves and safety glasses.
Waste Disposal	To prevent short circuit, batteries should be completely discharged prior to disposal, terminals taped and/or capped. When completely discharged it is not considered hazardous. This product does not contain any materials listed by the United States EPA as requiring specific waste disposal requirements. These are exempted from the hazardous waste disposal standards under Universal Waste Regulations. Disposal of large quantities of Lithium Ion batteries or cells may be subject to Local, State or Federal / Provincial regulations. Consult your Local, State and Federal / Provincial regulations regarding disposal of these batteries.

SECTION 8 – TRANSPORTATION AND REGULATORY INFORMATION

Shipping and Transportation	1) Product is shipped as: **Ground (DOT)** Non-Hazardous by ground UN3090 **Air (IATA/ICAO)** Lithium ion Batteries – Not restricted UN3090 **Sea (IMDG)** Lithium ion Batteries – Not restricted (2) Special shipping information. These batteries have been tested to Section 38.3 of 'UN Manual of Test and Criteria'. It is below the limits set by the 2010 IATA Dangerous Goods Regulations 51st edition Packing Instruction 965 Section II is applied. And they are out of scope for Special Provision A154. Also the consignment complies with the current edition – 51st 2010 of the IATA regulation 1) Section II of Packing Instruction - PI965 for Lithium Ion Batteries (UN3480) 2) UN manual of Tests and Criteria, Part III, sub-section 38.3 (withstanding a 1.2m drop (test); 3) Watt-hour rating is not more than 100 Wh which shown on the batteries 4) Labeled with a lithium battery handling label 5) Package permissible gross weight has been observed (Cargo Aircraft is 10kg Gross)
Regulatory Information	The transport of rechargeable lithium-ion batteries is regulated by various bodies (IATA, IMO, ADR, US-DOT) that follow the United Nations *"Recommendations on the Transport of Dangerous Goods, Model Regulations, 13th Revised edition - 2003 - Ref. ST/SG/AC.10/1 Rev. 13"*. Depending on their lithium metal equivalent weight content, design, and ability to pass safety tests defined by the UN in the *"Recommendations on the Transport of Dangerous Good - Manual of Tests and Criteria - 3rd Revised edition - 2002 - Ref. ST/SG/AC.10/11 Rev.3 Amendment 1 «Lithium Batteries»"*, the lithium-ion cells and the battery packs may or may not be assigned to the UN N° 3090 Class-9, that is restricted for transport. Individual lithium-ion cells and battery packs with respectively less than 1.5 and 8 grams of equivalent lithium metal content that pass the UN-defined safety tests, are not restricted for transport (1.0 Ah of declared nominal capacity = 0.3 gram of Li equivalent weight content).
Other Information	The information contained herein is furnished without warranty of any kind. Users should consider this data only as a supplement to other information gathered by them and must make independent determinations of the suitability and completeness of information from all sources to assure proper use and disposal of these materials and the safety and health of employees and customers.

Loctite 680 Retaining Compound

Material Safety Data Sheet

Revision Number: 005.0

Issue date: 04/09/2012

1. PRODUCT AND COMPANY IDENTIFICATION

Product name: Loctite® 680 Retaining Compound
Product type: Anaerobic Adhesive

Company address:
Henkel Corporation
One Henkel Way
Rocky Hill, Connecticut 06067

IDH number: 234948
Item number: 68015
Region: United States

Contact information:
Telephone: 860.571.5100
MEDICAL EMERGENCY Phone: Poison Control Center
1-877-671-4608 (toll free) or 1-303-592-1711
TRANSPORT EMERGENCY Phone: CHEMTREC
1-800-424-9300 (toll free) or 1-703-527-3887
Internet: www.henkelna.com

2. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

Physical state: Liquid
Color: Green
Odor: Mild

HMIS:
HEALTH: *2
FLAMMABILITY: 1
PHYSICAL HAZARD: 1
Personal Protection: See MSDS Section 8

WARNING: CAUSES EYE IRRITATION.
MAY CAUSE ALLERGIC SKIN REACTION.
MAY CAUSE SKIN IRRITATION.
MAY CAUSE RESPIRATORY TRACT IRRITATION.

Relevant routes of exposure: Skin, Inhalation, Eyes

Potential Health Effects

Inhalation: May cause respiratory tract irritation.
Skin contact: May cause allergic skin reaction. May cause skin irritation.
Eye contact: Contact with eyes will cause irritation.
Ingestion: May be harmful if swallowed.

Existing conditions aggravated by exposure: Eye, skin, and respiratory disorders.

This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

See Section 11 for additional toxicological information.

3. COMPOSITION / INFORMATION ON INGREDIENTS

Hazardous components	CAS NUMBER	%
2-Propenoic acid, 2-methyl-, (1-methylethylidene)	24448-20-2	30 - 60
Hydroxyalkyl methacrylate	27813-02-1	30 - 60
Bisphenol A fumarate resin	39382-25-7	10 - 30
Cumene hydroperoxide	80-15-9	1 - 5
Polyglycol dimethacrylate	25852-47-5	1 - 5
1-Acetyl-2-phenylhydrazine	114-83-0	0.1 - 1
Cumene	98-82-8	0.1 - 1

4. FIRST AID MEASURES

Inhalation:	Move to fresh air. If symptoms develop and persist, get medical attention.
Skin contact:	Wash with soap and water. Remove contaminated clothing and footwear. Wash clothing before reuse. If symptoms develop and persist, get medical attention.
Eye contact:	Flush with copious amounts of water, preferably, lukewarm water for at least 15 minutes, holding eyelids open all the time. Get medical attention.
Ingestion:	Do not induce vomiting. Keep individual calm. Get medical attention.

5. FIRE FIGHTING MEASURES

Flash point:	> 93.3 °C (> 199.94 °F) Tagliabue closed cup
Autoignition temperature:	Not available.
Flammable/Explosive limits - lower:	Not available.
Flammable/Explosive limits - upper:	Not available.
Extinguishing media:	Foam, dry chemical or carbon dioxide. Foam, dry chemical or carbon dioxide.
Special firefighting procedures:	Wear self-contained breathing apparatus and full protective clothing, such as turn-out gear. Wear self-contained breathing apparatus and full protective clothing, such as turn-out gear.
Unusual fire or explosion hazards:	None None
Hazardous combustion products:	Oxides of carbon. Oxides of sulfur. Oxides of nitrogen. Irritating organic vapours.Oxides of carbon. Oxides of sulfur. Oxides of nitrogen. Irritating organic vapours.

6. ACCIDENTAL RELEASE MEASURES

Use personal protection recommended in Section 8, isolate the hazard area and deny entry to unnecessary and unprotected personnel.

Environmental precautions:	Do not allow product to enter sewer or waterways.
Clean-up methods:	For small spills wipe up with paper towel and place in container for disposal. For large spills absorb onto inert absorbent material and place in sealed container for disposal.

7. HANDLING AND STORAGE

Handling:	Use only with adequate ventilation. Prevent contact with eyes, skin and clothing. Do not breathe vapor and mist. Wash thoroughly after handling.
Storage:	For safe storage, store at or below 38 °C (100.4 °F) Keep in a cool, well ventilated area away from heat, sparks and open flame. Keep container tightly closed until ready for use.

For information on product shelf life contact Henkel Customer Service at (800) 243-4874.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Employers should complete an assessment of all workplaces to determine the need for, and selection of, proper exposure controls and protective equipment for each task performed.

Hazardous components	ACGIH TLV	OSHA PEL	AIHA WEEL	OTHER
2-Propenoic acid, 2-methyl-, (1-methylethylidene)	None	None	None	None
Hydroxyalkyl methacrylate	None	None	None	1 ppm TWA 3 ppm STEL
Bisphenol A fumarate resin	None	None	None	None
Cumene hydroperoxide	None	None	1 ppm (6 mg/m3) TWA (SKIN)	None
Polyglycol dimethacrylate	None	None	None	None
1-Acetyl-2-phenylhydrazine	None	None	None	None
Cumene	50 ppm TWA	50 ppm (245 mg/m3) TWA (SKIN)	None	None

Engineering controls: Local exhaust ventilation is recommended when general ventilation is not sufficient to control airborne contamination below occupational exposure limits.

Respiratory protection: Use NIOSH approved respirator if there is potential to exceed exposure limit(s). Use an organic vapor respirator for concentrations exceeding the Occupational Exposure Limit.

Eye/face protection: Safety goggles or safety glasses with side shields.

Skin protection: Use impermeable gloves and protective clothing as necessary to prevent skin contact. Neoprene gloves.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state: Liquid
Color: Green
Odor: Mild
Odor threshold: Not available.
pH: Not applicable
Vapor pressure: < 5 mm hg (27 °C (80.6 °F))
Boiling point/range: > 149 °C (> 300.2 °F)
Melting point/ range: Not available.
Specific gravity: 1.11 at 26.6 °C (79.88 °F)
Vapor density: Not available.
Flash point: > 93.3 °C (> 199.94 °F) Tagliabue closed cup
Flammable/Explosive limits - lower: Not available.
Flammable/Explosive limits - upper: Not available.
Autoignition temperature: Not available.
Evaporation rate: Not available.
Solubility in water: Slight
Partition coefficient (n-octanol/water): Not available.
VOC content: 4.22 %; 40.3 g/l

10. STABILITY AND REACTIVITY

Stability: Stable

Hazardous reactions: Will not occur.

Hazardous decomposition products: Oxides of carbon. Irritating organic vapours. Phenolics.

Incompatible materials: Strong oxidizing agents. Reducing agents. Acids. Bases. Rust. Zinc. Aluminum. Iron. Copper. Alkalis. Aldehydes. Amines. Free radical initiators. Peroxides.

Conditions to avoid: Exposure to sunlight. Heat, flames, sparks and other sources of ignition. See "Handling and Storage" (Section 7) and "Incompatibility" (Section 10).

11. TOXICOLOGICAL INFORMATION

Hazardous components	NTP Carcinogen	IARC Carcinogen	OSHA Carcinogen (Specifically Regulated)
2-Propenoic acid, 2-methyl-, (1-methylethylidene)	No	No	No
Hydroxyalkyl methacrylate	No	No	No
Bisphenol A fumarate resin	No	No	No
Cumene hydroperoxide	No	No	No
Polyglycol dimethacrylate	No	No	No
1-Acetyl-2-phenylhydrazine	No	No	No
Cumene	No	Group 2B	No

Hazardous components	Health Effects/Target Organs
2-Propenoic acid, 2-methyl-, (1-methylethylidene)	Irritant, Allergen
Hydroxyalkyl methacrylate	Irritant, Allergen
Bisphenol A fumarate resin	No Target Organs
Cumene hydroperoxide	Allergen, Central nervous system, Corrosive, Irritant, Mutagen
Polyglycol dimethacrylate	Irritant, Allergen
1-Acetyl-2-phenylhydrazine	Allergen, Blood, Kidney, Mutagen, Some evidence of carcinogenicity
Cumene	Central nervous system, Irritant, Lung

12. ECOLOGICAL INFORMATION

Ecological information: Not available.

13. DISPOSAL CONSIDERATIONS

Information provided is for unused product only.

Recommended method of disposal: Follow all local, state, federal and provincial regulations for disposal.

Hazardous waste number: Not a RCRA hazardous waste.

14. TRANSPORT INFORMATION

The shipping classifications in this sections are for non-bulk packaging only (unless otherwise specified). Shipping classification may be different for bulk packaging.

U.S. Department of Transportation Ground (49 CFR)
Proper shipping name: Not regulated
Hazard class or division: None
Identification number: None
Packing group: None

International Air Transportation (ICAO/IATA)
Proper shipping name: Not regulated
Hazard class or division: None
Identification number: None
Packing group: None

Water Transportation (IMO/IMDG)
Proper shipping name: Not regulated
Hazard class or division: None
Identification number: None
Packing group: None

15. REGULATORY INFORMATION

United States Regulatory Information

TSCA 8 (b) Inventory Status:	All components are listed or are exempt from listing on the Toxic Substances Control Act Inventory.
TSCA 12(b) Export Notification:	None above reporting de minimus
CERCLA/SARA Section 302 EHS:	None above reporting de minimus
CERCLA/SARA Section 311/312:	Immediate Health, Delayed Health
CERCLA/SARA 313:	This product contains the following toxic chemicals subject to the reporting requirements of section 313 of the Emergency Planning and Community Right-To-Know Act of 1986 (40 CFR 372). Cumene hydroperoxide (CAS# 80-15-9).
CERCLA Reportable quantity:	Cumene hydroperoxide (CAS# 80-15-9) 10 lbs. (4.54 kg)
California Proposition 65:	This product contains a chemical known in the State of California to cause cancer. This product contains a chemical known to the State of California to cause birth defects or other reproductive harm.

Canada Regulatory Information

CEPA DSL/NDSL Status:	All components are listed on or are exempt from listing on the Canadian Domestic Substances List.
WHMIS hazard class:	D.2.A, D.2.B

16. OTHER INFORMATION

This material safety data sheet contains changes from the previous version in sections: New information added in Section(s): 1, 3, 8, 11, 15

Prepared by: Kyra Kozak Woods, Manager, Regulatory Affairs

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Loctite 7649 Primer

Material Safety Data Sheet

Revision Number: 004.1

Issue date: 02/18/2013

1. PRODUCT AND COMPANY IDENTIFICATION

Product name: PRIMER N 7649 (25GM)
Product type: Accelerator

Company address:
Henkel Corporation
One Henkel Way
Rocky Hill, Connecticut 06067

IDH number: 231020
Item number: 21347
Region: United States

Contact information:
Telephone: 860.571.5100
MEDICAL EMERGENCY Phone: Poison Control Center
1-877-671-4608 (toll free) or 1-303-592-1711
TRANSPORT EMERGENCY Phone: CHEMTREC
1-800-424-9300 (toll free) or 1-703-527-3887
Internet: www.henkelna.com

2. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

Physical state: Liquid
Color: Green
Odor: Acetone

HMIS:
HEALTH: *2
FLAMMABILITY: 3
PHYSICAL HAZARD: 0
Personal Protection: See MSDS Section 8

DANGER: CAUSES EYE AND SKIN IRRITATION.
MAY CAUSE RESPIRATORY TRACT IRRITATION.
FLAMMABLE LIQUID AND VAPOR.

Relevant routes of exposure: Inhalation, Skin, Eye contact, Ingestion

Potential Health Effects

Inhalation: Vapors and mists will irritate nose and throat and possibly eyes. May cause respiratory tract irritation. Excessive inhalation of this material causes headache, dizziness, nausea and incoordination. Harmful by inhalation.

Skin contact: May cause skin irritation. Solvent action can dry and defat the skin, causing the skin to crack, leading to dermatitis.

Eye contact: Vapors may irritate eyes. Contact with eyes will cause irritation.

Ingestion: Harmful if swallowed.

Existing conditions aggravated by exposure: Eye, skin, and respiratory disorders.

This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

See Section 11 for additional toxicological information.

3. COMPOSITION / INFORMATION ON INGREDIENTS

Hazardous components	CAS NUMBER	%
Acetone	67-64-1	60 - 100
Isobutane	75-28-5	10 - 30
Hexanoic acid, 2-ethyl-, compd. with N,N-dibutyl-1-butanamine (1:1)	58823-74-8	0.1 - 1
Chromium	7440-47-3	0 - 0.1
Iron	7439-89-6	0 - 0.1
Nickel	7440-02-0	0 - 0.1
Cobalt	7440-48-4	0 - 0.1
2-Ethylhexanoic acid, copper salt	22221-10-9	0.1 - 1
2-Ethylhexanoic acid	149-57-5	0.1 - 1
2-Propanol	67-63-0	0 - 0.1
Acetaldehyde	75-07-0	0 - 0.1
Benzene	71-43-2	0 - 0.1
Formaldehyde	50-00-0	0 - 0.1
Water	7732-18-5	0 - 0.1

4. FIRST AID MEASURES

Inhalation: Move to fresh air. If symptoms persist, seek medical advice.

Skin contact: Wash with soap and water. If symptoms develop and persist, get medical attention.

Eye contact: Flush with copious amounts of water, preferably, lukewarm water for at least 15 minutes, holding eyelids open all the time. Get medical attention.

Ingestion: If conscious, drink plenty of water. Do not induce vomiting. Keep individual calm. Get medical attention.

5. FIRE FIGHTING MEASURES

Flash point: Not available.

Autoignition temperature: Not available.

Flammable/Explosive limits - lower: Not available.

Flammable/Explosive limits - upper: Not available.

Extinguishing media: Foam, dry chemical or carbon dioxide.

Special firefighting procedures: Wear self-contained breathing apparatus and full protective clothing, such as turn-out gear.

Unusual fire or explosion hazards: Vapors may accumulate in low or confined areas, travel considerable distance to source of ignition, and flash back.

Hazardous combustion products: Oxides of carbon. Oxides of nitrogen. Irritating organic vapours.

6. ACCIDENTAL RELEASE MEASURES

Use personal protection recommended in Section 8, isolate the hazard area and deny entry to unnecessary and unprotected personnel.

Environmental precautions: Do not allow product to enter sewer or waterways.

Clean-up methods: Remove all sources of ignition. Ensure adequate ventilation. Soak up with inert absorbent material (e.g. sand, silica gel, acid binder, universal binder, sawdust). Store in a partly filled, closed container until disposal.

7. HANDLING AND STORAGE

Handling: Prevent contact with eyes, skin and clothing. Do not breathe vapor and mist. Wash thoroughly after handling. During use and until all vapors are gone: Keep area ventilated - do not smoke; extinguish all flames, pilot lights, and heaters; turn off stoves, electrical tools and appliances, and any other sources of ignition.

Storage: For safe storage, store at or below 49 °C (120.2 °F)
Store away from heat, sparks, flames, or other sources of ignition.

For information on product shelf life contact Henkel Customer Service at (800) 243-4874.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Employers should complete an assessment of all workplaces to determine the need for, and selection of, proper exposure controls and protective equipment for each task performed.

Hazardous components	ACGIH TLV	OSHA PEL	AIHA WEEL	OTHER
Acetone	500 ppm TWA 750 ppm STEL	1,000 ppm (2,400 mg/m3) TWA	None	None
Isobutane	1,000 ppm TWA	None	None	None
Hexanoic acid, 2-ethyl-, compd. with N,N-dibutyl-1-butanamine (1:1)	None	None	None	None
Chromium	0.5 mg/m3 TWA (as Cr) 0.5 mg/m3 TWA (as Cr)	1 mg/m3 TWA (as Cr)	None	None
Iron	None	None	None	None
Nickel	1.5 mg/m3 TWA Inhalable fraction.	1 mg/m3 TWA (as Ni)	None	None
Cobalt	0.02 mg/m3 TWA (as Co)	0.1 mg/m3 TWA (as Co) Dust and fume.	None	None
2-Ethylhexanoic acid, copper salt	None	None	None	None
2-Ethylhexanoic acid	5 mg/m3 TWA Inhalable fraction and vapor.	None	None	None
2-Propanol	200 ppm TWA 400 ppm STEL	400 ppm (980 mg/m3) TWA	None	None
Acetaldehyde	25 ppm Ceiling	200 ppm (360 mg/m3) TWA	None	None
Benzene	2.5 ppm STEL 0.5 ppm TWA (SKIN)	1 ppm TWA 0.5 ppm OSHA ACT 5 ppm STEL 50 ppm MAX. CONC 10 minutes 25 ppm Ceiling 10 ppm TWA	None	None
Formaldehyde	0.3 ppm Ceiling (Sensitiser.)	2 ppm STEL 0.5 ppm OSHA ACT 0.75 ppm TWA	None	None
Water	None	None	None	None

Engineering controls: Use local ventilation if general ventilation is insufficient to maintain vapor concentration below established exposure limits.

Respiratory protection: Use NIOSH approved respirator if there is potential to exceed exposure limit(s).

Eye/face protection:	Safety goggles or safety glasses with side shields.
Skin protection:	Neoprene, Butyl-rubber, or nitrile-rubber gloves. Chemical resistant, impermeable gloves.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state:	Liquid
Color:	Green
Odor:	Acetone
Odor threshold:	Not available.
pH:	Not available.
Vapor pressure:	172 mm hg (68 °F (20°C))
Boiling point/range:	133 °F (56.1 °C)
Melting point/ range:	Not available.
Specific gravity:	0.7936
Vapor density:	2.0
Flash point:	Not available.
Flammable/Explosive limits - lower:	Not available.
Flammable/Explosive limits - upper:	Not available.
Autoignition temperature:	Not available.
Evaporation rate:	1.9 (Ether = 1)
Solubility in water:	Soluble
Partition coefficient (n-octanol/water):	Not available.
VOC content:	1.48 %; 11.7 g/l EPA Method 24

10. STABILITY AND REACTIVITY

Stability:	Stable
Hazardous reactions:	Will not occur.
Hazardous decomposition products:	Oxides of carbon. Oxides of nitrogen. Irritating organic vapours.
Incompatible materials:	Strong oxidizing agents. Acids.
Conditions to avoid:	See "Handling and Storage" (Section 7) and "Incompatibility" (Section 10).

11. TOXICOLOGICAL INFORMATION

Hazardous components	NTP Carcinogen	IARC Carcinogen	OSHA Carcinogen (Specifically Regulated)
Acetone	No	No	No
Isobutane	No	No	No
Hexanoic acid, 2-ethyl-, compd. with N,N-dibutyl-1-butanamine (1:1)	No	No	No
Chromium	No	No	No
Iron	No	No	No
Nickel	Reasonably Anticipated to be a Human Carcinogen.	Group 2B	No
Cobalt	No	Group 2B	No
2-Ethylhexanoic acid, copper salt	No	No	No
2-Ethylhexanoic acid	No	No	No
2-Propanol	No	No	No
Acetaldehyde	Reasonably Anticipated to be a Human Carcinogen.	Group 2BGroup 1	No
Benzene	Known To Be Human Carcinogen.	Group 1	No
Formaldehyde	Known To Be Human Carcinogen.	Group 1	No
Water	No	No	No

Hazardous components	Health Effects/Target Organs
Acetone	Blood, Central nervous system, Irritant, Reproductive
Isobutane	Cardiac, Central nervous system, Lung
Hexanoic acid, 2-ethyl-, compd. with N,N-dibutyl-1-butanamine (1:1)	No Records
Chromium	Irritant, Allergen, Eyes
Iron	Eyes, Lung
Nickel	Allergen, Carcinogen, Irritant, Kidney, Mutagen, Reproductive, Respiratory
Cobalt	Allergen, Blood, Developmental, Endocrine, Eyes, Gastrointestinal, Heart, Irritant, Kidney, Liver, Lung, Mutagen, Nervous System, Reproductive, Respiratory, Some evidence of carcinogenicity, Spleen, Less weight gain and food intake.
2-Ethylhexanoic acid, copper salt	No Target Organs
2-Ethylhexanoic acid	Developmental, Eyes, Irritant, Liver, Reproductive
2-Propanol	Allergen, Blood, Brain, Central nervous system, Irritant, Kidney, Liver, Spleen
Acetaldehyde	Allergen, Central nervous system, Irritant, Mutagen, Respiratory, Some evidence of carcinogenicity, Less weight gain and food intake.
Benzene	Blood, Bone Marrow, Carcinogen, Immune system, Irritant, Mutagen, Nervous System
Formaldehyde	Allergen, Behavioral, Central nervous system, Irritant, Liver, Metabolic, Mutagen, Reproductive, Respiratory, Some evidence of carcinogenicity
Water	No Target Organs

12. ECOLOGICAL INFORMATION

Ecological information: Do not empty into drains / surface water / ground water.

13. DISPOSAL CONSIDERATIONS

Information provided is for unused product only.

Recommended method of disposal: Follow all local, state, federal and provincial regulations for disposal.

Hazardous waste number: D001: Ignitable. This product may contain traces of: D018: Benzene. However this product is only classifiable as hazardous waste if it exhibits the characteristics of toxicity as shown by the toxicity characteristic leaching procedure (TCLP). Under RCRA, it is the responsibility of the end user of this product to determine whether it meets this criteria at the time of disposal.

14. TRANSPORT INFORMATION

U.S. Department of Transportation Ground (49 CFR)

Proper shipping name: Aerosols
Hazard class or division: 2.1
Identification number: UN 1950
Packing group: None

International Air Transportation (ICAO/IATA)

Proper shipping name: Aerosols, flammable
Hazard class or division: 2.1
Identification number: UN 1950
Packing group: None
Exceptions: ID8000, (Not more than 30 kg), May Qualify as Consumer Commodity

Water Transportation (IMO/IMDG)

Proper shipping name: AEROSOLS
Hazard class or division: 2.1
Identification number: UN 1950
Packing group: None
Exceptions: Limited quantity (Not more than 1 L).

15. REGULATORY INFORMATION

United States Regulatory Information

TSCA 8 (b) Inventory Status:	All components are listed or are exempt from listing on the Toxic Substances Control Act Inventory.
TSCA 12(b) Export Notification:	None above reporting de minimus
CERCLA/SARA Section 302 EHS:	None above reporting de minimis
CERCLA/SARA Section 311/312:	Delayed Health, Fire, Immediate Health
CERCLA/SARA 313:	None above reporting de minimis
California Proposition 65:	This product contains a chemical known in the State of California to cause cancer. This product contains a chemical known to the State of California to cause birth defects or other reproductive harm.

Canada Regulatory Information

CEPA DSL/NDSL Status:	All components are listed on or are exempt from listing on the Canadian Domestic Substances List.
WHMIS hazard class:	A, B.5, D.2.A, D.2.B

16. OTHER INFORMATION

This material safety data sheet contains changes from the previous version in sections: 1

Prepared by: Kyra Kozak Woods, Manager, Regulatory Affairs

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Leaded Solder

kester

Personal Protective Equipment	WHMIS Pictograms	DOT Pictograms
Safety Glasses, Protective Gloves	D2A Toxic	Not Regulated

SECTION 1 - PRODUCT AND COMPANY IDENTIFICATION

Product Name:	**Lead Solder Alloy**
Product Code:	Lead Solder Alloy
MSDS Manufacturer Number:	Lead Solder Alloy
Product Use/Restriction:	Solder
Manufacturer Name:	Kester
Address:	800 W. Thorndale Avenue Itasca, IL 60143
General Phone Number:	(630)-616-4000
Customer Service Phone Number:	(800)-2KESTER (253-7837)
CHEMTREC:	CHEMTREC 24-Hour Emergency Telephone Number: (800)424-9300 CHEMTREC 24-Hour Emergency Telephone Number: ((Outside of the U.S. and Canada):): (703)527-3887
Website:	msds@kestercom
MSDS Creation Date:	August 15, 2008
MSDS Revision Date:	March 11, 2010

NFPA

HMIS

Health Hazard	2*
Fire Hazard	0
Reactivity	0
Personal Protection	X

* Chronic Health Effects

SECTION 2 - COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name	CAS#	Ingredient Percent	EC Num.
Antimony	7440-36-0	0 - 10 by weight	
Bismuth	7440-69-9	0 - 10 by weight	
Zinc	7440-66-6	0 - 10 by weight	
Copper	7440-50-8	0 - 10 by weight	
Lead	7439-92-1	0 - 100 by weight	
Tin	7440-31-5	0 - 100 by weight	
Silver	7440-22-4	0 - 10 by weight	

SECTION 3 - HAZARDS IDENTIFICATION

Emergency Overview:	CAUTION! Irritant. Exposures to soldering fumes and vapors may be irritating to eyes, respiratory system, and skin.
Route of Exposure:	Eyes. Skin. Inhalation. Ingestion.
Eye:	Smoke during soldering can cause eye irritation.
Skin:	May cause irritation.
Inhalation:	Prolonged or excessive inhalation may cause respiratory tract irritation.
Ingestion:	May be harmful if swallowed. May cause vomiting.
Chronic Health Effects:	Suspected of damaging fertility or the unborn child Repeated and prolonged exposure to lead and lead compounds may cause abdominal pain, diarrhea, loss of appetite, metallic taste, nausea, vomiting, lassitude, insomnia, muscle weakness, joint and muscle pain, irritability, headache and dizziness. Red blood cells may be damaged resulting in anemia. Gastritis and injury to the kidneys, liver, male gonads, and central nervous system may also occur.
Lead :	
Carcinogenicity:	IARC: Group 2B: Possibly carcinogenic to humans.

SECTION 4 - FIRST AID MEASURES

Eye Contact:	Immediately flush eyes with plenty of water for 15 to 20 minutes. Get medical attention, if irritation or symptoms of overexposure persists.
Skin Contact:	Immediately wash skin with soap and plenty of water. Get medical attention if irritation develops or persists.
Inhalation:	If inhaled, remove to fresh air. If not breathing, give artificial respiration or give oxygen by trained personnel. Seek immediate medical attention.
Ingestion:	If swallowed, do NOT induce vomiting. Call a physician or poison control center immediately. Never give anything by mouth to an unconscious person.

SECTION 5 - FIRE FIGHTING MEASURES

Flash Point:	> 93 °C (> 199 °F)
Lower Flammable/Explosive Limit:	Not applicable.
Upper Flammable/Explosive Limit:	Not applicable.
Extinguishing Media:	Use alcohol resistant foam, carbon dioxide, dry chemical, or water fog or spray when fighting fires involving this material.
Unsuitable Media:	Do not use a solid water stream as it may scatter and spread fire.
Protective Equipment:	As in any fire, wear Self-Contained Breathing Apparatus (SCBA), MSHA/NIOSH (approved or equivalent) and full protective gear.
Hazardous Combustion Byproducts:	Oxides of carbon, oxides of nitrogen, aliphatic aldehydes, and other organic substances may be formed during combustion.. Melted solder above 1000 deg F will liberate toxic lead and/or antimony fumes

NFPA Ratings:

NFPA Health:	2
NFPA Flammability:	0
NFPA Reactivity:	0
NFPA Other:	

SECTION 6 - ACCIDENTAL RELEASE MEASURES

Personnel Precautions:	Evacuate area and keep unnecessary and unprotected personnel from entering the spill area. Avoid inhaling vapors, mists, or fumes. Avoid contact with skin, eyes and clothing.
Environmental Precautions:	Avoid runoff into storm sewers, ditches, and waterways.
Methods for containment:	Melted solder will solidify on cooling and can be scraped up.
Methods for cleanup:	Solidfied solder can be scraped up upon cooling. Use caution to avoid breathing fumes if a gas torch is used to cut up large pieces.

SECTION 7 - HANDLING and STORAGE

Handling:	Use with adequate ventilation. Avoid breathing vapor and fumes. Use only in accordance with directions.
Storage:	No special storage conditions required.
Hygiene Practices:	Wash thoroughly after handling. Avoid inhaling vapors, mists, or fumes.

SECTION 8 - EXPOSURE CONTROLS, PERSONAL PROTECTION - EXPOSURE GUIDELINES

Engineering Controls:	Use appropriate engineering control such as process enclosures, local exhaust ventilation, or other engineering controls to control airborne levels below recommended exposure limits. Where such systems are not effective wear suitable personal protective equipment, which performs satisfactorily and meets OSHA or other recognized standards. Consult with local procedures for selection, training, inspection and maintenance of the personal protective equipment.
Eye/Face Protection:	Safety glasses with side-shields.
Hand Protection Description:	Wear appropriate protective gloves. Consult glove manufacturer's data for permeability data.
Respiratory Protection:	When ventilation is not sufficient to remove fumes from the breathing zone, a safety approved respirator or self- contained breathing apparatus should be worn.

EXPOSURE GUIDELINES

Antimony :	
Guideline ACGIH:	TLV-TWA: 0.5 mg/m3
Guideline OSHA:	PEL-TWA: 0.5 mg/m3
Copper :	
Guideline ACGIH:	TLV-TWA: 1 mg/m3
Guideline OSHA:	PEL-TWA: 1 mg/m3
Lead :	
Guideline ACGIH:	TLV-TWA: 0.05 mg/m3
Guideline OSHA:	PEL-TWA: 0.05 mg/m3
Tin :	

Guideline ACGIH:	TLV-TWA: 2 mg/m3
Guideline OSHA:	PEL-TWA: 2 mg/m3
Silver :	
Guideline ACGIH:	TLV-TWA: 0.1 mg/m3
Guideline OSHA:	PEL-TWA: 0.01 mg/m3

SECTION 9 - PHYSICAL and CHEMICAL PROPERTIES

Physical State Appearance:	Solid
Color:	Silver grey
Odor:	Odorless
Boiling Point:	Not determined.
Melting Point:	> 100 °C (> 212 deg F)
Density:	>7 g/cm³ (@ 20 °C (68 °F))
Flash Point:	> 93 °C (> 199 °F)

SECTION 10 - STABILITY and REACTIVITY

Chemical Stability:	Stable under normal temperatures and pressures.
Hazardous Polymerization:	Not reported.
Conditions to Avoid:	No thermal decomposition if used according to specifications.
Incompatible Materials:	Oxidizing agents. Strong acids and alkalis.
Special Decomposition Products:	When heated to soldering temperatures, the solvents are evaporated and rosin may be thermally degraded to liberate aliphatic aldehydes and acids.

SECTION 11 - TOXICOLOGICAL INFORMATION

Antimony :

Ingestion: Oral - Rat LD50: 100 mg/kg [Details of toxic effects not reported other than lethal dose value.] (RTECS)

Bismuth :

Ingestion: Oral - Mouse LD50: 10 gm/kg [Details of toxic effects not reported other than lethal dose value.]
Oral - Rat LD50: 5 gm/kg [Details of toxic effects not reported other than lethal dose value.] (RTECS)

Zinc :

Skin: Skin - Human Standard Draize Test. : 300 ug/3D-I - [mild](RTECS)

Inhalation: Inhalation. - Human TCLo - Lowest published toxic concentration: 124 mg/m3/50M - [Lungs, Thorax, or Respiration - cough Lungs, Thorax, or Respiration - dyspnea Skin and Appendages - sweating] (RTECS)

Ingestion: Oral - Bird duck LDLo: 388 mg/kg - [Autonomic Nervous System - other (direct) parasympathomimetic oral - ataxia Blood - changes in leukocyte (WBC) count] (RTECS)

Copper :

Ingestion: Oral - Mouse LD50: 413 mg/kg [Details of toxic effects not reported other than lethal dose value.]
Oral - Mouse LD50: >5000 mg/kg [Behavioral - food intake (animal) Gastrointestinal - hypermotility, diarrhea Gastrointestinal - nausea or vomiting] (RTECS)

Silver :

Ingestion: Oral - Mouse LD50: 100 mg/kg [Details of toxic effects not reported other than lethal dose value.] (RTECS)

SECTION 12 - ECOLOGICAL INFORMATION

Ecotoxicity:	No ecotoxicity data was found for the product.
Environmental Fate:	No environmental information found for this product.

SECTION 13 - DISPOSAL CONSIDERATIONS

Waste Disposal:	Consult with the US EPA Guidelines listed in 40 CFR Part 261.3 for the classifications of hazardous waste prior to disposal. Furthermore, consult with your state and local waste requirements or guidelines, if applicable, to ensure compliance. Arrange disposal in accordance to the EPA and/or state and local guidelines.

SECTION 14 - TRANSPORT INFORMATION

DOT Shipping Name:	Not Regulated.
DOT UN Number:	Not Regulated.
IATA Shipping Name:	Not Regulated.
IATA UN Number:	Not Regulated.
IMDG UN NUmber :	Not Regulated.
IMDG Shipping Name :	Not Regulated.
RID UN Number :	Not Regulated.

RID Shipping Name :	Not Regulated.

SECTION 15 - REGULATORY INFORMATION

Canada Reg. Status:	This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by the Controlled Products Regulations.
Canada WHMIS:	Controlled - Class: D2A Very Toxic
Antimony :	
TSCA Inventory Status:	Listed
Canada DSL:	Listed
Bismuth :	
TSCA Inventory Status:	Listed
Canada DSL:	Listed
Zinc :	
TSCA Inventory Status:	Listed
Canada DSL:	Listed
Copper :	
TSCA Inventory Status:	Listed
Canada DSL:	Listed
Lead :	
TSCA Inventory Status:	Listed
Canada DSL:	Listed
Tin :	
TSCA Inventory Status:	Listed
Canada DSL:	Listed
Silver :	
TSCA Inventory Status:	Listed
Canada DSL:	Listed

WHMIS Pictograms

SECTION 16 - ADDITIONAL INFORMATION

General Use:	Solder
HMIS Health Hazard:	2*
HMIS Fire Hazard:	0
HMIS Reactivity:	0
HMIS Personal Protection:	X
MSDS Creation Date:	August 15, 2008
MSDS Revision Date:	March 11, 2010
Disclaimer:	The information contained herein is based on data considered accurate and is offered solely for information, consideration and investigation. Kester extends no warranties, makes no representations and assumes no responsibilty as to the accuracy, completeness or suitability of this data for any purchaser's use. The data on this Material Safety Data Sheet relates only to this product and does not relate to use with any other material or in any process. All chemical products should be used only by, or under the direction of, technically qualified personnel who are aware of the hazards involved and the necessity for reasonable care in handling. Hazard communication regulations require that employees must be trained on how to use a Material Safety Data Sheet as a source for hazard information.

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Nomex Fabric

Nomex Felt

UNITHERM insulation systems

Material Safety Data Sheet

1. Company & Product Information

Company Name:
UniTherm Insulation Systems
711 Jones Street
Lewisville, Texas 75057
p | 800.657.9542 f | 972.436.0112

Product:
Nomex Felt

2. Hazardous Ingredients

Specific Chemical Identity	%	OSHA PEL	ACGIH TLV
None	n/a	n/a	n/a

3. Physical / Chemical Characteristics

Boiling Point:	n/a
Specific Gravity (H2O=)	1.3 to 1.6
Vapor Pressure:	n/a
Melting Point:	n/a
Solubility in Water:	Insoluble
Appearance:	Fabric yarns are various colors
Odor:	No odor

4. Fire and Hazard Explosion Data

Flash Point:	n/a
Flammable Limits:	n/a
LEL:	n/a
UEL:	n/a
Extinguishing Media:	Foam, water and Co2 Dry Chemical
Special Fire Fighting Procedures:	Use self-containing breathing apparatus and full protective equipment. All fires produce toxic gases.
Unusual Fire and Explosive Hazard:	Decomposition products are roughly comparable with those of wool.

www.unitherm.com | 800.657.9542

5. Reactivity Data

Stability:	Stable
Incompatibility:	Generally unaffected by common materials and chemicals
Hazard Decomposition or By-products:	Carbon dioxide, carbon monoxide and diverse organic compounds of low molecular weight
Hazardous Polymerization:	Will not occur
Conditions to Avoid:	None

6. Health Hazard Data

Threshold Limit Value:	n/a
Effects of Overexposure:	None
Emergency and First Aid Procedures:	This product has no significant hazards
Inhalation:	Do not breathe dust, move to fresh air if inhalation occurs and if irritation persists seek medical attention
Skin Contact:	None
Skin Absorption:	n/a
Eye Contact:	Flush with flowing water for at least 15 minutes; seek medical attention if irritation persists.
Ingestion:	n/a
Carcinogenicity:	Not Known
Special Considerations:	If sensitive to nuisance particles, wear dust mask, safety glasses or goggles to prevent physical irritation.

7. Storage / Handling & Disposal

Storage & Handling:	All cardboard containers, rolls and bags must be stored in compliance with relevant regulations and in accordance with good handling and storage practices.
Disposal:	This product must be disposed of in the same manner as any non-hazardous industrial waste in an authorized waste disposal facility in accordance with all federal, state and local regulations.

8. Employee Protection

The following precautions are advisable during cutting and fabrication or other operation that could generate dust while using this material.

Ventilation:	General dilution and/or local exhaust ventilation should be provided as necessary to maintain exposures below occupational exposure limits.
Respiratory Protection:	A properly fitted dust mask should be worn to prevent inhalation of dust particles when cutting. If inhalation occurs go to fresh air and if irritation persists seek medical attention.
Eye Protection:	Use safety glasses, goggles or face shield as necessary
Protective Clothing:	Wear loose fitting long sleeve shirts or other appropriate clothing to protect those area where irritation could occur.

Plywood

Material Safety Data Sheet
PLYWOOD

Plum Creek
Growing Value from Exceptional Resources

Plum Creek Northwest Plywood, Inc.
500 12th Ave. West
P.O. BOX 1990
Columbia Falls, MT 59912

Emergency Phone: 406-892-6200
Other Information: 406-892-6312
Revised Date: November 22, 2010
Website: www.plumcreek.com

SECTION 1: IDENTITY

Common Name (used on label) (Trade Name & Synonyms)	SOFTWOOD PLYWOOD	Cas No.	N/A
Chemical Name	N/A	Chemical Family	N/A
Formula	DOUGLAS FIR, WESTERN LARCH		

SECTION 2: HAZARDOUS INGREDIENTS

Principal Hazardous Component(s) (chemical & common name(s))		Threshold Limit Value (units)
SOFTWOOD WOOD DUST * Wood dust is currently listed as a probable human carcinogen but regulated as Particle Not Otherwise Classified (PNOC).		15.0 mg/m^3
PHENOL FORMALDEHYDE RESIN FREE FORMALDEHYDE EMISSIONS *California Air Resources Board (CARB)* *Panels were tested using a "large chamber" method. *Ambient background formaldehyde levels are typically between 0.03 to 0.08 ppm. *These products easily meet or have been exempted from leading formaldehyde emissions standards and regulations. *NAUF contains no added urea formaldehyde	CARB Threshold < 0.5ppm Actual .048 ppm	0.5 ppm (Action) 0.75 ppm (TLV) 2.0 ppm (STEL)

SECTION 3: PHYSICAL & CHEMICAL CHARACTERISTICS (Fire & Explosion Data)

Boiling Point	N/A	Specific Gravity (H_20=1)	N/A	Vapor Pressure (mm Hg)	N/A
Percent Volatile By Volume (%)		Vapor Density (Air=1)	N/A	Evaporation Rate (_____= 1)	N/A
Solubility In Water	N/A	Reactivity in Water	N/A		
Appearance and Odor	LIGHT BROWN OR TAN PANEL WITH AROMATIC ODOR.				
Flash Point N/A	Flammable Limits in Air % by Volume	Lower N/A	Upper N/A	Extinguisher Media Water,	Auto-Ignition Temperature 400˚– 500˚F
Special Fire Fighting Procedures	SATURATE BOARD WITH WATER AND MOVE TO A SECURE OUTSIDE STORAGE LOCATION. AVOID BREATHING SMOKE.				
Unusual Fire and Explosion Hazards	WOOD DUST GENERATED FROM SAWING, SANDING, MACHINING, ETC. MAY CREATE A FIRE AND EXPLOSION HAZARD. AVOID DUST ACCUMULATIONS.				

SECTION 4: PHYSICAL HAZARDS

Stability	Unstable [ ] Stable [x]	Conditions to Avoid
Incompatibility (Materials to Avoid)	OXIDIZERS AND DRYING OILS.	
Hazardous Decomposition Products	TOXIC FUMES AND GASES, INCLUDING CARBON MONOXIDE	
Hazardous Polymerization	May Occur [ ] Will Not Occur [x]	Conditions to Avoid

SECTION 5: HEALTH HAZARDS

Signs and Symptoms of Exposure	1. Acute Overexposure	WOOD DUST MAY CAUSE EYE AND RESPIRATORY IRRITATION, NASAL DRYNESS, COUGHING, SNEEZING AND WHEEZING AS A RESULT OF INHALATION.
	2. Chronic Overexposure	WOOD DUST MAY CAUSE ALLERGIC DERMATITIS AND RESPIRATORY SENSITIZATION. PROLONGED EXPOSURE TO WOOD DUST HAS BEEN REPORTED BY SOME AGENCIES TO BE ASSOCIATED WITH NASAL CANCER.

Medical Conditions Generally Aggravated by Exposure	PRE-EXISTING RESPIRATORY CONDITIONS			
Chemical Listed as Carcinogen or Potential Carcinogen	WOOD DUST FORMALDEHYDE	National Toxicology Program Yes [ ] No [ ]	I.A.R.C. Monographs Yes [x] No [ ]	OSHA Yes [x] No [ ]
OSHA Permissible Exposure Limit	15.0 mg/m^3 PNOC 0.75 ppm FORMALDEHYDE		Other Exposure Limit Used	10.0 mg/m^3 STEL WOOD DUST

OSHA Permissible Exposure Limit	WOOD DUST	Total: 15 mg/m3 Respirable: 5 mg/m3

ACGIH Theshold Limit Value	Wood Dust 1mg/m3

California Proposition 65 Warning: DRILLING, SAWING, SANDING OR MACHINING WOOD PRODUCTS GENERATES WOOD DUST, A SUBSTANCE KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER. AVOID INHALING WOOD DUST OR USE A DUST MASK OR OTHER SAFEGAURDS FOR PERSONAL PROTECTION.

HMIS RATINGS: HEALTH: 1* FIRE: 0 PHYSICAL HAZARD: 0
SCALE: 0 = MINIMAL 1 = SLIGHT 2 = MODERATE 3 = SERIOUS 4 = SEVERE

SECTION 6: EMERGENCY AND FIRST AID PROCEDURES

Emergency and First Aid Procedures:

1. Inhalation	EXPOSURE TO EXCESSIVE CONCENTRATIONS MAY CAUSE UNPLEASANT DEPOSITION IN THE NASAL PASSAGE RESULTING IN DRYNESS, COUGH AND HEADACHE. AVOID BREATHING DUST, REMOVE FROM EXPOSURE.
2. Eyes	MAY MECHANICALLY IRRITATE EYES RESULTING IN REDNESS OR WATERING. FLUSH WITH CLEAN WATER TO REMOVE PARTICLES. IF IRRITATION PERSISTS, SEEK MEDICAL ATTENTION.
3. Skin	MAY ELICIT CONTACT DERMATITIS IN SENSITIZED INDIVIDUALS OR CAUSE MECHANICAL IRRITATION. IF IRRITATION OR DERMATITIS DEVELOPS, SEEK MEDICAL ATTENTION.
4. Ingestion	N/A

SECTION 7: SPECIAL PROTECTION INFORMATION

Respiratory Protection (Specific Type)	NIOSH APPROVED DUST RESPIRATOR.								
Ventilation	RECOMMENDED	Local Exhaust	RECOMMENDED	Mechanical (General)	AS NEEDED	Special	N/A	Other	N/A
Protective Gloves	RECOMMENDED			Eye Protection	SAFETY GLASSES, AND/OR GOGGLES				
Other Protective Clothing or Equipment	PROTECTIVE OUTER LAYER MAY BE DESIRABLE IN EXTREMELY DUSTY AREAS.								

SECTION 8: SPECIAL PRECAUTIONS AND SPILL/LEAK PROCEDURES

Precautions to be Taken in Handling and Storage	STORE IN COOL, DRY PLACE AWAY FROM OPEN FLAME, SPARKS OR HOT SURFACES.
Other Precautions	STORE IN A COOL, DRY PLACE AWAY FROM OPEN FLAME, SPARKS OR HOT SURFACES.
Steps to be Taken in Case Material is Released or Spilled	VACUUM, SWEEP, OR SHOVEL TO MINIMIZE DUST GENERATION. PROVIDE ADEQUATE VENTILATION.
Waste Disposal Methods	DISPOSE ACCORDING TO APPLICABLE FEDERAL, STATE AND LOCAL REGULATIONS. ASHES ARE CORROSIVE.

IMPORTANT

Polyethylene Terephthalate (Dacron)

MATERIAL SAFETY DATA SHEET

CHEMICAL PRODUCT / COMPANY IDENTIFICATION

MATERIAL IDENTIFICATION:

Product name: ARYAPET Polyethylene Terephthalate (PET) resin

Product numbers: AP0076, AP0076 (FRH) AP0080, AP0084, AP0084 (FRH), AP0076HF, AP0089, Amorphous chips

Product applications: Industrial resin. Injection stretch blow moulding into containers, bottles, jars, films, sheets and straps.

COMPANY INFORMATION:
MANUFACTURER:
JBF INDUSTRIES LIMITED
8TH FLOOR, EXPRESS TOWERS
NARIMAN POINT, MUMBAI – 400021
INDIA
TEL: +91-22-22885959, FAX: +91-22-22886393

COMPOSITION / INFORMATION ON INGREDIENTS

COMPONENTS:		%
Material	CAS Number	
POLYETHYLENE TEREPHTHALATE	25038-59-9	>99%
Modifiers / fillers/additives		<1%

Remarks: Ingredients are proprietary or non-hazardous.

HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW:
Clear to grayish-white, odorless pellets.
High concentrations of dusts may be an explosion hazard.
Material can be handled as hot, molten polymer. Contact with molten polymer can cause burns.
Thermal processing may release irritating gases or fumes.

POTENTIAL HEALTH EFFECTS:
Molten polymer will adhere to the skin and can cause severe burns.
Eye contact with Polyethylene Terephthalate particles may cause mechanical irritation with discomfort, tearing, or blurring of vision.
Decomposition products caused by overheating Polyethylene Terephthalate may cause skin, eye or respiratory tract irritation.

CARCINOGENICITY INFORMATION:
None of the components present in this material at concentrations equal to or greater than 0.1% are listed by IARC, NTP, OSHA or ACGIH as a carcinogen.

FIRST AID MEASURES:
Inhalation: No specific intervention is indicated, as the compound is not likely to be hazardous by inhalation. However, if exposed to fumes from overheating or combustion, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician if necessary.

Skin Contact: The compound is not likely to be hazardous by skin contact but cleansing the skin after use is advisable. If molten material gets on skin, cool rapidly with cold water. Do not attempt to remove material from skin. Obtain medical treatment for thermal burn. Use of high temperature resistant gloves is recommended while handling PET polymer or during processing.

Eye Contact: If irritation develops, immediately flush eyes with plenty of water for at least 15 minutes. Call a physician. Use of safely glasses / face shield is recommended.

Ingestion: Ingestion is not an expected route of exposure during normal use of the product. If ingested during processing, consult a physician.

ADVICE TO PHYSICIAN: Treat burns as thermal burns

FIRE FIGHTING MEASURES

FLAMMABLE PROPERTIES:
Flash Point: Not Applicable
Auto-ignition: No Data Available
Physical operations, such as grinding, can create dust and a potential dust explosion hazard. Under these conditions, follow National Fire Protection Association Code and Standards for handling combustible dusts.

EXTINGUISHING MEDIA:
Water spray, Foam, Carbon Dioxide, and Dry Chemical.

FIRE FIGHTING INSTRUCTIONS:
Wear self-contained breathing apparatus. Wear full protective equipment. Avoid excessive inhalation of smoke or potential thermal decomposition products.

ACCIDENTAL RELEASE MEASURES

SAFEGUARDS (PERSONNEL):
NOTE: Review FIRE FIGHTING MEASURES and HANDLING (PERSONNEL) sections before proceeding with clean-up. Use appropriate PERSONAL PROTECTIVE EQUIPMENT during clean-up.

Due to lower thermal conductivity, the interior of molten masses may remain hot for some time. Use appropriate PERSONAL PROTECTIVE EQUIPMENT when disposing of molten masses.

SPILL CLEAN UP:
Sweep up and recover, or mix material with moist absorbent and shovel into suitable chemical waste container.

HANDLING AND STORAGE

HANDLING (PERSONNEL):
Do not breathe vapors or fumes that may be evolved during high temperature processing. Contact with hot/molten material can cause burns. Avoid contact with molten material. Use appropriate PERSONAL PROTECTIVE EQUIPMENTS.

HANDLING (PHYSICAL ASPECTS):
Avoid dust generation.

EXPOSURE CONTROLS/PERSONAL PROTECTION

ENGINEERING CONTROLS:
Use local ventilation to control fumes from hot processing.
Processes such as pneumatic conveying systems, grinding and other physical operations can create dust. There is the potential for a dust explosion hazard. Use appropriate mechanical ventilation system.

PERSONAL PROTECTIVE EQUIPMENT:
EYE/FACE PROTECTION:
Wear safety goggles and face shield when the possibility exists for eye or face contact from airborne material.

RESPIRATORY PROTECTION:
Respirators are not needed for normal use.
Where airborne concentrations are expected to exceed exposure limits, a NIOSH approved respirator should be selected based on the form and concentration of the contaminant in air and in accordance with OSHA Respiratory Protection Standard CFR 1910.134.

PROTECTIVE CLOTHING:
If there is potential for contact with hot/molten material, wear heat-resistant clothing and footwear. Special protective clothing is not needed for normal use. High temperature resistant gloves are recommended.

EXPOSURE GUIDELINES:
Applicable Exposure Limits
PEL (OSHA): None Established
TLV (ACGIH): None Established

Comply with national occupational threshold values for dust or powder.

PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL DATA:
Appearance: Pellets or Molten Polymer
Color: Clear to grayish white
Odor: Odorless
Melting Point: No Data Available
Vapor Pressure: Not Applicable
Vapor Density: Not Applicable
Solubility in Water: Insoluble
pH: Not Applicable
Specific Gravity: 1.3-1.4
% Volatiles: Negligible
Flash point: Not determined

STABILITY AND REACTIVITY

CHEMICAL STABILITY:
Stable at normal conditions.
INCOMPATIBILITY WITH OTHER MATERIALS:
Incompatible or can react with strong oxidizers.
DECOMPOSITION:
Combustion products include carbon dioxide and carbon monoxide. Thermal decomposition products can include acetaldehyde and ethylene.
POLYMERIZATION:
Polymerization will not occur.

TOXICOLOGICAL INFORMATION

Polyethylene Terephthalate is not a skin irritant.
Can develop eye irritation due to dust exposure.
Low acute toxicity. Fumes, vapors or dust inhalation may cause irritation to the respiratory system.
Toxic effects from short exposures by ingestion resulted in no adverse effects.
Animal testing indicates that Polyethylene Terephthalate does not have carcinogenic, mutagenic, developmental or reproductive effects.

ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL INFORMATION:
No data is available.

DISPOSAL CONSIDERATIONS

WASTE DISPOSAL:

Treatment, storage, transportation, and disposal must be in accordance with applicable Central, State/Provincial, and Local regulations.

TRANSPORTATION INFORMATION

SHIPPING INFORMATION:
DOT - Not Regulated.
IMDG Class: Not restricted
ICAO/ IATA Class: Not restricted

REGULATORY INFORMATION

Indication of Danger / Symbol(s): Not classified as dangerous for supply/ use.
Code letter and hazard designation of product: Not applicable
Hazard-determining components of labeling: Not applicable
Risk phrase(s): Not applicable
Safety phrase(s): Not applicable
The data in this Material Safety Data Sheet relates only to the specific material designated herein and does not relate to use in combination with any other material or in any process.

CAUTION

DO NOT USE JBF ARYAPET MATERIALS IN MEDICAL APPLICATIONS INVOLVING PERMANENT, BRIEF, OR TEMPORARY IMPLANTATION IN THE HUMAN BODY OR PERMANENT CONTACT WITH INTERNAL BODY FLUIDS OR TISSUES, UNLESS THE MATERIAL HAS BEEN PROVIDED DIRECTLY FROM JBF UNDER A CONTRACT WHICH EXPRESSLY ACKNOWLEDGES THE CONTEMPLATED USE.

JBF MAKES NO REPRESENTATION, PROMISE, EXPRESS WARRANTY OR IMPLIED WARRANTY CONCERNING THE SUITABILITY OF THESE MATERIALS FOR USE IN THE HUMAN BODY OR IN CONTACT WITH INTERNAL BODY FLUIDS OR TISSUES.

THE CONTENT OF JBF ARYAPET MATERIAL IS NOT CERTIFIED FOR IMPLANTS.

JBF ARYAPET materials are not designed or manufactured for use in implantation in the human body or in contact with internal body fluids or tissues. DAK has not performed clinical testing of these materials for implantation.
JBF will not provide to customers making implantable devices any notice concerning its materials, as specified under 21 C.F.R section 820.81, or any other information necessary for medical device use of the materials under any other statue or FDA regulation. JBF has neither sought, nor received, approval from the FDA for the use of these materials in implantation in the human body or in contact with internal body fluids or tissues.
ALL IMPLANTABLE MEDICAL DEVICES CARRY A RISK OF FAILURE AND ADVERSE CONSEQUENCES.

The medical judgment of a physician, a medical device seller and the FDA should be relied upon for identification of both harmful consequences and life-saving benefits from an implantation device comprised of specific materials. These benefits and risks can be found in published medical cases performing clinical medical studies of an implantable medical device. JBF does not

support the use of its products in these applications and cannot weigh the benefits against the risk defined in these articles.
JBF can not offer a medical judgment on the safety or efficacy of the use of its materials in such devices.

DO NOT MAKE REFERENCE TO THE JBF NAME OR ANY JBF ARYAPET TRADENAME IN ASSOCIATION WITH AN IMPLANTABLE MEDICAL DEVICE.

Do not use a JBF ARYAPET or licensed trademark as the descriptive name of an implantable medical device (e.g. do not call it the "ARYAPET" prosthesis, or do not call it a "ARYAPET device").

Please contact JBF Industries Limited if there is uncertainty about the suitability of the intended use.

Polylactic Acid (PLA Plastic)

Safety data sheet

FUTERRO POLYLACTIC ACID OLIGOMERS

Product : PRUB-PLA03 | Version (en) nr : 1.1 | Revised : 30/07/2010 | Supersedes : 15/10/2009

WARNING :
FOR STACKING
PALLETS, SEE
SECTION 7

1. Identification of the substance / preparation and of the company / undertaking

Trade name	FUTERRO POLYLACTIC ACID OLIGOMERS
SDS number	PRUB-PLA03
Chemical name	Polylactique acide
CAS number	9051-89-2
MATERIAL USE	raw material (Pre-polymers)
Recommended uses and restrictions	Restricted to professional users
RESPONSIBLE FOR PLACING ON THE MARKET	
Trade name of the firm	see below this page.
EMERGENCY NUMBER	FUTERRO : + 32 (0)69 45 22 76 info@futerro.com
Official advisory body	The UK National Poisons Emergency number is 0870 600 6266 (Outside the UK: +44 870 600 6266) NB: these services are only available to health professionals IRL: The National Poisons Information Centre PO Box 1297, Beaumont Hospital, Beaumont Road Dublin 9. Telephone: +353 (01) 837 9966 / +353 (01) 809 2568

2. Hazards identification

Classification & Labelling

EC-GHS	Not classified according to the regulation EC 1272/2008 (EC-GHS) and ATP
67/548/EEC & 1999/45/EC	Not classified according to EEC directives 67/548/EEC (dangerous substances) and 1999/45/EC (dangerous preparations).
Main hazards	none to our knowledge low risk for temperatures below 150 °C
Adverse human health effects	
Inhalation	fine dust may cause irritation of respiratory system and mucous. if heated to more than 150°C, the product may form vapours or fumes which may cause irritation of respiratory tract and cause coughing and

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Safety data sheet

FUTERRO POLYLACTIC ACID OLIGOMERS

	sensation of shortness of breath.
Skin contact	may be irritating in contact with hot material, may cause severe thermal burns
Eye contact	fine dust may cause irritation to ocular mucous.
Ingestion	in case of ingestion of small quantities, no important effect observed. in case of ingestion of larger amounts: abdominal pain, diarrhoea, ...
Adverse environmental effects	the product is inherently biodegradable
Adverse physicochemical effects	combustible if exposed to flames. flowing product can create electrical charge, resulting sparks may ignite dust or cause an explosion in some concentration ranges.
Label elements	
EC-GHS	Not classified according to the regulation EC 1272/2008 (EC-GHS) and ATP
Pictogram(s)	-

Other hazards	no information available

3. Composition / information on ingredients

chemical name	Polylactique acide
Concentration (%)	> 98 %
CAS number	9051-89-2
EINECS or ELINCS number	the product is a polymer, following the European regulation, registration on the EINECS (European Inventory of Existing Commercial Chemical Substances) inventory is not required.
EC-GHS	non required
67/548/EEC & 1999/45/EC	non required
Substances presenting a health hazard	none to our knowledge

4. First-aid measures

Description of first aid measures

IN CASE OF HEAVY OR PERSISTENT DISTURBANCES, CALL A DOCTOR OR SEEK MEDICAL ADVICE URGENTLY

Route of exposure

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Inhalation	exposure to spray, fumes and vapours produced by heated or burned product: bring patient into fresh air seek medical advice.
Skin contact	in case of irritation caused by fine dust: wash with copious volumes of water, until the irritation disappears. exposure to splashing of hot product: treat the affected part with cold water (by spraying or immersion). no attempt should be made to detach molten product adhering to the skin or to remove clothing attached with molten material, the injured body part would risk being pulled out; usually the layer detaches itself after a few days. in case of severe burns, seek hospital treatment
Eye contact	in case of irritation caused by fine dust: wash with copious volumes of water, until the irritation disappears. Get medical advice (ophthalmologist) exposure to splashing of hot product: treat the eyes with cold water. in case of severe burns, seek hospital treatment
Ingestion	do not induce vomiting. seek medical advice immediately.
Most important symptoms and effects	refer to § 11 for more details on effects.
Indication of any medical attention	no information available

5. Fire - fighting measures

Technical measures	stop the fire spreading. call the fire brigade immediately. evacuate non-essential personnel protective clothing, goggles and self-contained breathing equipment should be made available for firemen.
Extinguishing media	
Suitable	for minor fires : carbon dioxide (CO_2) or powder,water for more extensive fires : foam. water spray (mist) to cool the surfaces exposed to the fire.
Not to be used	do not use water jets (stick jets) for extinguishing fire since they could help to spread the flames
Special peril	complete combustion, with an excess of oxygen forms: carbon dioxide (CO_2) and water vapour. partial combustion, forms also: carbon monoxide (CO), soot and cracked products: aldehydes, ketones
Special exposure hazards	dust may form an explosive mixture with air, ignited by sparks or sources of ignition.

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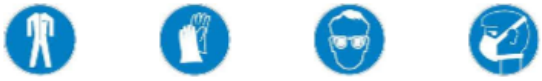
	however, when the pictorial warning as shown on the top of the safety data sheet is affixed to the pallet, the pallet must never be placed either on top of or below another pallet. N.B. :here the term pallet includes both the pallet and its load. when pallets are stored in racks, it should be checked whether the pallet is fit for stacking in the concerned racks
Incompatible materials	avoid contact with strong oxidizing materials , water
container	
Suitable	Polyethylene,stainless steel
VbF-Klasse (Germany)	
SPECIFIC USE(S)	no information available
refer to point 8	

8. Exposure controls / personal protection

Exposure controls	refer to any national measures that may be relevant.
OCCUPATIONAL EXPOSURE LIMIT	inhalable dust particles: US (ACGIH-2009): TLV-8h TWA: 10 mg/m³ UK: HSE EH40/2005: Long-term exposure limit (8-hour TWA reference period) : 10 mg/m³ (Total Inhalable Dust) IRL(2002): OEL (8h): 10 mg/m³ (total inhalable) ZA (2006): OEL (8h): 10 mg/m³ (inhalable particulate: PNOC) respirable dust particles: US (ACGIH-2009): TLV- 8h TWA: 3 mg/m³ UK: HSE EH40/2005: Long-term exposure limit (8-hour TWA reference period) : 4 mg/m³ (Respirable Dust) IRL(2002): OEL (8h): 4 mg/m³ (respirable) ZA (2006): OEL (8h): 5 mg/m³ (respirable particulate: PNOC)
EXPOSURE CONTROLS	
Occupational exposure controls	
Personal protection	
Respiratory protection	in case of risk of overexposure to dust, vapour or fumes (during product processing), it is recommended that a local exhaust system is placed above the conversion equipment (a fume hood) and the working area must be properly ventilated. wear a suitable anti-dust respirator

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	recommended filter type : P1
Skin and body protection	where exposure is likely, protective clothing must be worn including gloves
Eye protection	goggles/spectacles
Other personal protection	safety non-slip shoes in areas where spills or leaks can occur. shower and eye fountain available.
Industrial health measures	
General use	avoid contact with skin and eyes. do not store near food products. remove all contaminated clothing and remove protective clothing when the work is completed.
Environmental exposure controls	no information available

9. Physical and chemical properties

GENERAL INFORMATION

Appearance	pellets from a diameter of 2 to 5 mm
Physical state at 20°C	solid
Colour	transparent , translucent , white opaque
Odour	odourless

IMPORTANT HEALTH, SAFETY AND ENVIRONMENTAL INFORMATION

Change in physical state at 1013 hPa	
Melting range (°C)	20 - 180
Softening point (°C)	55 - 65
Flash point (ASTM D 1929)(°C)	> 250
Decomposition point (°C)	> 220
Auto-ignition temperature (°C)	> 250
Explosion limits (kg/m³)	:
Lower	0,015 (for polymer dust < 63 µm)
Vapour pressure at 20°C (hPa)	none
Density, mass at 20°C (kg/m³)	1200 to 1300
Solubility in water at 20°C (mg/l)	insoluble
pH value (concentrated product)	not applicable
Viscosity (mm²/s)	not applicable

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OTHER INFORMATION	no information available

10. Stability and reactivity

REACTIVITY

Stability	stable under normal operating conditions of storage, handling and use
Hazardous reactions	dust may form an explosive mixture with air, ignited by sparks or sources of ignition.
CONDITIONS TO AVOID	avoid contact with strong oxidizing materials water avoid proximity or contact with flames or sparks it is recommended not to heat at a temperature higher than 230 °C
HAZARDOUS DECOMPOSITION PRODUCTS	complete combustion, with an excess of oxygen forms: carbon dioxide (CO_2) and water vapour. partial combustion, forms also: carbon monoxide (CO), soot and cracked products: aldehydes, ketones
Advice to prevent explosion	avoid dust accumulation by use of filters in the pneumatic transport equipment. thoroughly ventilate the working place. all conductive materials must be electrically earthed.

11. Toxicological information

ACUTE TOXICITY

Ingestion	in case of ingestion of small quantities, no important effect observed. in case of ingestion of larger amounts: abdominal pain, diarrhoea, ...

LOCAL EFFECT

Inhalation	dust may cause irritation of respiratory system. if heated to more than 150°C, the product may form vapours or fumes which may cause irritation of respiratory tract and cause coughing and sensation of shortness of breath.
Skin contact	may be irritating in contact with hot material, may cause severe thermal burns thermal decomposition products are produced at elevated temperatures and these may be irritating
Eye contact	fine dust may cause irritation to ocular mucous. splashing of molten droplets causes ocular tissue burns. thermal decomposition products are produced at elevated temperatures and these may be irritating

SENSITIZATION

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Skin contact	following the available information, not regarded as a sensitiser
SPECIFIC EFFECTS	no particular preoccupation for man (According to available experimental data)

12. Ecological information

Information on ecological effects	avoid losses to the environment whenever possible.
ECOTOXICITY	because of its structure, the product should not be dangerous for aquatic life
72 hours-IC50-Algae (mg/l)	> 1100 mg/l
PERSISTENCE AND DEGRADABILITY	
Biodegradation	the product is inherently biodegradable
BIOACCUMULATIVE POTENTIAL	potential bioaccumulation of the product in environment is very low
MOBILITY	
water / air	there is a slow loss by evaporation
soil and sediments	because of its physico-chemical properties, the product has a low soil mobility
Results of PBT and vPvB assessment	non required

13. Disposal considerations

Waste disposal	dispose in a safe manner in accordance with local/national regulations. authorized disposal do not dispose off by means of sinks, drains or into the immediate environment
Disposal of contaminated packaging	dispose in a safe manner in accordance with local/national regulations.

14. Transport information

Road (ADR) / Rail (RID)	Not restricted for transport.
UN Number	not applicable
Marine (IMO)	Not restricted for transport.
Air transport (ICAO / IATA)	Not restricted for transport.

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15. Regulatory information

Safety, health and environmental regulations/legislation specific for the substance or mixture

Germany

Wassergefährdungsklasse	NWG: non-hazardous to waters
Registration	the product is a polymer, following the European regulation, registration on the EINECS (European Inventory of Existing Commercial Chemical Substances) inventory is not required. listed on the United States TSCA (Toxic Substances Control Act) inventory listed on the Canadian DSL (Domestic Substances List) inventory. listed on the Japanese ENCS (Existing & New Chemical Substances) inventory. listed on the Korean ECL (Existing Chemical List) inventory. listed on the People's Republic of China register: CRC-SEPA (Chemical Registration Center for Chinese State Environmental Protection Administration)
Other	refer to any national measures that may be relevant.

16. Other information

Training advice	The use of this product requires specific training. The user must receive all product information in order to handle the product safely (personal protection equipment and best practice standards)
Further information	no information available

Safety data sheet conforms to the Regulation (EU) N° 1907/2006

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Safety data sheet

FUTERRO POLYLACTIC ACID OLIGOMERS

Product : PRUB-PLA03 | Version (en) nr : 1.1 | Revised : 30/07/2010 | Supersedes : 15/10/2009

This information applies to the PRODUCT AS SUCH and conforming to specifications of FUTERRO.
In case of formulations or mixtures, it is necessary to ascertain that a new danger will not appear.
The information contained is based on our knowledge of the product, at the date of publishing and it is given quite sincerely. However the revision of some data is in progress.
Users are advised of possible additional hazards when the product is used in applications for which it was not intended. This sheet shall only be used and reproduced for prevention and security purposes.
The references to legislative, regulatory and codes of practice documents cannot be considered as exhaustive.
It is the responsibility of the person receiving the product to refer to the totality of the official documents concerning the use, the possession and the handling of the product.
It is also the responsibility of the handlers of the product to pass on to any subsequent persons who will come into contact with the product. (usage, storage, cleaning of containers, other processes) the totality of the information contained within this safety data sheet and necessary for safety at work, the protection of health and the protection of environment.

The (*) indicate the changes made with respect to the previous version.

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Polypropylene

POLYPROPYLENE Material Safety Data Sheet

I. General Information	
Chemical Name & Synonyms Polypropylene	Trade Name & Synonyms Natural Homopolymer Polypropylene, O, P grade polypropylene.
Chemical Family Homopolymer Polypropylene	Formula [Ch (ch3) ch2-]
Proper DOT Shipping Name: N/A	DOT Hazard Classification: N/A

II. Ingredients		
Principal Components	Percent	Threshold Limit Value (Units)
Polypropylene (9003-07-0)	>99%	10mg/m3 (total dust)

III. Physical Data	
Boiling Point (Deg. F.) N/A	Specific Gravity (H20=1) .90-.91
Vapor Pressure (mm Hg) N/A	Percent Volatile By Volume (%)
Vapor Density (Air=1) N/A	Evaporation Rate (Air =1) N/A
Solubility in Water Negligible	pH N/A
Appearance & Odor Opaque, or white, solid, no odor	

IV. Fire & Explosion Hazard Data		
Flash Point (Test Method) >500F (260C)	Auto Ignition Temperature 735F (388C)	
Flammable Limits N/A	LEL N/A	UEL N/A
Extinguishing Media Water, Foam, Carbon Dioxide, Dry Chemical		
Special Fire Fighting Procedures Slow burning plastic that emits a dense black smoke. Firefighters should wear a self-contained breathing apparatus and protective clothing.		
Unusual Fire & Explosion Hazards Dust is flammable when finely divided (less than 200 mesh) and suspended in air. Combustion products may be hazardous.		

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POLYPROPYLENE Material Safety Data Sheet

V. Health Hazard Data

OSHA Permissible Exposure Limit	ACGIH Threshold Limit Value
15 mg/m3 total dust, 5 mg/m3 respirable dusts.	10 mg/m3 total dust
Carcinogen - NTP Program	Carcinogen - IARC Program
NO	NO

Symptoms of Exposure

Polypropylene heated to 700 deg. F can irritate the respiratory tract.

Medical Conditions Aggravated By Exposure

None known, however, seek medical attention if constant irritation occurs. If thermal decomposition occurs, upper respiratory, eye, nose, and throat irritation may result.

Primary Route(s) of Entry

Inhalation of particulates.

Emergency First Aid

Molten material. If molten material comes in contact with the skin, cool under running water. Do not attempt to remove the molten material from the skin. Get medical attention.

VI. Reactivity Data

STABILITY ____ Unstable	Conditions To Avoid
_X_ Stable	None Known
INCOMPATABILITY	Materials To Avoid
Hazardous __ May Occur	Strong oxidizing agents.
Polymerization X Will Not Occur	Conditions To Avoid
	None Known

Hazardous Decomposition Products: Carbon Monoxide, Carbon Dioxide, organic oxidation products, acrid smoke, and fumes.

VII. Environmental Protection Procedures

Spill Response...Sweep up for Disposal or reuse.

Waste Disposal Method...Incineration or landfill - dispose of in accordance with Federal, State and Local regulations.

VIII. Special Protection Information

Eye Protection	Skin Protection
Glasses with side shields.	Use insulated gloves when handling molten material.

Respiratory Protection (Specific Type) - NIOSH approved dust respirator recommended. If material is being burned wear an organic respirator.

Ventilation Recommended - Local ventilation in dusty conditions, or if thermal decomposition occurs.

Other Protection

Gloves and protective garments when handling molten material.

IX. Special Precautions

Hygienic Practices In Handling & Storage: Wash with soap and water.

Precautions For Repair & Maintenance Of Contaminated Equipment: Eliminate ignition sources.

Other Precautions

Avoid excess breathing of vapors, fumes, or smoke that may be released during thermal processing. Store in a sprinkler protected warehouse. Natural Homopolymer Polypropylene will burn if ignited.

NFPA Code: Fire 1, Health 0, Reactivity 0

HMIS Code: Fire 1, Health 0, Reactivity 0

Pg. 2

POLYPROPYLENE Material Safety Data Sheet

X. Regulatory Information
OSHA Status: Polypropylene is not considered hazardous under OHSA.
TSCA Inventory Status: All ingredients are listed.
CERCLA Reportable Quantity (RQ): None
SARA Title III: Section 302/304.No extremely hazardous substances Section 311/312.No reporting requirements although it is suggested that storage of >10,000 lbs of polypropylene in one facility should be listed on a Tier II report. Section 313: No reporting requirements.

Hazard data contained herein was obtained from raw material suppliers. The information presented is believed to be factual, as it was derived from the works and opinions of persons believed to be qualified. However, no facts contained in the information are to be taken as a warranty, or representation, for which A&C Plastics Inc. bears legal responsibility. The user should review any recommendation in the specific context of the intended use to determine if they are appropriate.

N.A.= Not Applicable N.E.= Not Established

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Pg. 3

Proline (60 Minute Epoxy)

D-Proline

sc-255062

Material Safety Data Sheet

Hazard Alert Code Key: EXTREME | HIGH | MODERATE | LOW

Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME
D-Proline

STATEMENT OF HAZARDOUS NATURE
Not considered a hazardous substance according to OSHA 29 CFR 1910.1200.

NFPA

SUPPLIER
Company: Santa Cruz Biotechnology, Inc.
Address:
2145 Delaware Ave
Santa Cruz, CA 95060
Telephone: 800.457.3801 or 831.457.3800
Emergency Tel: **CHEMWATCH: From within the US and Canada: 877-715-9305**
Emergency Tel: **From outside the US and Canada: +800 2436 2255 (1-800-CHEMCALL) or call +613 9573 3112**

PRODUCT USE
Laboratory reagent. Used in biochemical research.

SYNONYMS
C5-H9-N-O2, "2-pyrrolidinecarboxylic acid", "2-pyrrolidine carboxylic acid", amino-acid

Section 2 - HAZARDS IDENTIFICATION

CHEMWATCH HAZARD RATINGS

	Min	Max
Flammability:	1	
Toxicity:	0	
Body Contact:	0	
Reactivity:	1	
Chronic:	0	

Min/Nil=0
Low=1
Moderate=2
High=3
Extreme=4

CANADIAN WHMIS SYMBOLS

None

EMERGENCY OVERVIEW
RISK

POTENTIAL HEALTH EFFECTS

ACUTE HEALTH EFFECTS

SWALLOWED
■ The material has NOT been classified as "harmful by ingestion". This is because of the lack of corroborating animal or human evidence. The material may still be damaging to the health of the individual, following ingestion, especially where pre-existing organ (e.g. liver, kidney) damage is evident. Present definitions of harmful or toxic substances are generally based on doses producing mortality (death) rather than those producing morbidity (disease, ill-health). Gastrointestinal tract discomfort may produce nausea and vomiting. In an occupational setting however, unintentional ingestion is not thought to be cause for concern.

EYE
■ Although the material is not thought to be an irritant, direct contact with the eye may cause transient discomfort characterized by tearing or conjunctival redness (as with windburn). Slight abrasive damage may also result. The material may produce foreign body irritation in certain individuals.

SKIN
■ The material is not thought to produce adverse health effects or skin irritation following contact (as classified using animal models). Nevertheless, good hygiene practice requires that exposure be kept to a minimum and that suitable gloves be used in an occupational setting.

INHALED
■ The material is not thought to produce adverse health effects or irritation of the respiratory tract (as classified using animal models). Nevertheless, good hygiene practice requires that exposure be kept to a minimum and that suitable control measures be used in an occupational setting.
■ Persons with impaired respiratory function, airway diseases and conditions such as emphysema or chronic bronchitis, may incur further disability if excessive concentrations of particulate are inhaled.
■ Not normally a hazard due to non-volatile nature of product.

CHRONIC HEALTH EFFECTS
■ Long-term exposure to the product is not thought to produce chronic effects adverse to the health (as classified using animal models); nevertheless exposure by all routes should be minimized as a matter of course.
Long term exposure to high dust concentrations may cause changes in lung function i.e. pneumoconiosis; caused by particles less than 0.5 micron penetrating and remaining in the lung. Prime symptom is breathlessness; lung shadows show on X-ray.

Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

NAME	CAS RN	%
D-proline	344-25-2	100

Section 4 - FIRST AID MEASURES

SWALLOWED
■
- Immediately give a glass of water.
- First aid is not generally required. If in doubt, contact a Poisons Information Center or a doctor.

EYE
■ If this product comes in contact with eyes:
- Wash out immediately with water.
- If irritation continues, seek medical attention.
- Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.

SKIN
■ If skin or hair contact occurs:
- Flush skin and hair with running water (and soap if available).
- Seek medical attention in event of irritation.

INHALED
■
- If dust is inhaled, remove from contaminated area.
- Encourage patient to blow nose to ensure clear passage of breathing.
- If irritation or discomfort persists seek medical attention.

NOTES TO PHYSICIAN
■ Treat symptomatically.

Section 5 - FIRE FIGHTING MEASURES

Vapour Pressure (mmHG):	Negligible
Upper Explosive Limit (%):	Not available.
Specific Gravity (water=1):	Not available.
Lower Explosive Limit (%):	Not available.

EXTINGUISHING MEDIA

- There is no restriction on the type of extinguisher which may be used.

Use extinguishing media suitable for surrounding area.

FIRE FIGHTING

- Alert Emergency Responders and tell them location and nature of hazard.
- Wear breathing apparatus plus protective gloves for fire only.
- Prevent, by any means available, spillage from entering drains or water course.
- Use fire fighting procedures suitable for surrounding area.
- Do not approach containers suspected to be hot.
- Cool fire exposed containers with water spray from a protected location.
- If safe to do so, remove containers from path of fire.
- Equipment should be thoroughly decontaminated after use.

GENERAL FIRE HAZARDS/HAZARDOUS COMBUSTIBLE PRODUCTS

- Combustible solid which burns but propagates flame with difficulty.
- Avoid generating dust, particularly clouds of dust in a confined or unventilated space as dusts may form an explosive mixture with air, and any source of ignition, i.e. flame or spark, will cause fire or explosion. Dust clouds generated by the fine grinding of the solid are a particular hazard; accumulations of fine dust may burn rapidly and fiercely if ignited.
- Dry dust can be charged electrostatically by turbulence, pneumatic transport, pouring, in exhaust ducts and during transport.
- Build-up of electrostatic charge may be prevented by bonding and grounding.
- Powder handling equipment such as dust collectors, dryers and mills may require additional protection measures such as explosion venting.

Combustion products include: carbon monoxide (CO), carbon dioxide (CO_2), nitrogen oxides (NO_x), other pyrolysis products typical of burning organic material.

FIRE INCOMPATIBILITY

- Avoid contamination with oxidizing agents i.e. nitrates, oxidizing acids,chlorine bleaches, pool chlorine etc. as ignition may result.

PERSONAL PROTECTION

Glasses:
Chemical goggles.
Gloves:
Respirator:
Particulate

Section 6 - ACCIDENTAL RELEASE MEASURES

MINOR SPILLS

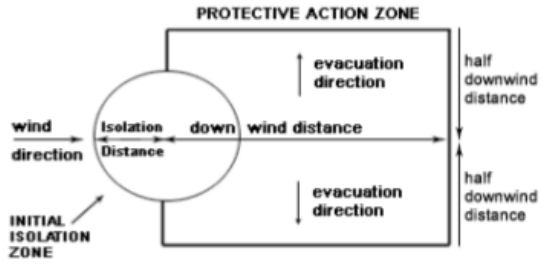
- Clean up all spills immediately.
- Avoid contact with skin and eyes.
- Wear impervious gloves and safety glasses.
- Use dry clean up procedures and avoid generating dust.
- Sweep up or vacuum up (consider explosion-proof machines designed to be grounded during storage and use).
- Place spilled material in clean, dry, sealable, labeled container.

MAJOR SPILLS

- Clear area of personnel and move upwind.
- Alert Emergency Responders and tell them location and nature of hazard.
- Control personal contact by using protective equipment and dust respirator.
- Prevent spillage from entering drains, sewers or water courses.
- Avoid generating dust.
- Sweep, shovel up.
- Recover product wherever possible.
- Put residues in labeled plastic bags or other containers for disposal.

- If contamination of drains or waterways occurs, advise emergency services.

PROTECTIVE ACTIONS FOR SPILL



From IERG (Canada/Australia)	
Isolation Distance	-
Downwind Protection Distance	-

From US Emergency Response Guide 2000 Guide No guide found.

FOOTNOTES

1 PROTECTIVE ACTION ZONE is defined as the area in which people are at risk of harmful exposure. This zone assumes that random changes in wind direction confines the vapour plume to an area within 30 degrees on either side of the predominant wind direction, resulting in a crosswind protective action distance equal to the downwind protective action distance.
2 PROTECTIVE ACTIONS should be initiated to the extent possible, beginning with those closest to the spill and working away from the site in the downwind direction. Within the protective action zone a level of vapour concentration may exist resulting in nearly all unprotected persons becoming incapacitated and unable to take protective action and/or incurring serious or irreversible health effects.
3 INITIAL ISOLATION ZONE is determined as an area, including upwind of the incident, within which a high probability of localised wind reversal may expose nearly all persons without appropriate protection to life-threatening concentrations of the material.
4 SMALL SPILLS involve a leaking package of 200 litres (55 US gallons) or less, such as a drum (jerrican or box with inner containers). Larger packages leaking less than 200 litres and compressed gas leaking from a small cylinder are also considered "small spills". LARGE SPILLS involve many small leaking packages or a leaking package of greater than 200 litres, such as a cargo tank, portable tank or a "one-tonne" compressed gas cylinder.
5 Guide No guide found. is taken from the US DOT emergency response guide book.
6 IERG information is derived from CANUTEC - Transport Canada.

ACUTE EXPOSURE GUIDELINE LEVELS (AEGL) (in ppm)

AEGL 1: The airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience notable discomfort, irritation, or certain asymptomatic nonsensory effects. However, the effects are not disabling and are transient and reversible upon cessation of exposure.
AEGL 2: The airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience irreversible or other serious, long-lasting adverse health effects or an impaired ability to escape.
AEGL 3: The airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience life-threatening health effects or death.

Section 7 - HANDLING AND STORAGE

PROCEDURE FOR HANDLING

- Limit all unnecessary personal contact.
- Wear protective clothing when risk of exposure occurs.
- Use in a well-ventilated area.
- Avoid contact with incompatible materials.
- When handling, DO NOT eat, drink or smoke.
- Keep containers securely sealed when not in use.
- Avoid physical damage to containers.
- Always wash hands with soap and water after handling.
- Work clothes should be laundered separately.
- Use good occupational work practice.
- Observe manufacturer's storing and handling recommendations.
- Atmosphere should be regularly checked against established exposure standards to ensure safe working conditions are maintained.

Empty containers may contain residual dust which has the potential to accumulate following settling. Such dusts may explode in the presence of an appropriate ignition source.

- Do NOT cut, drill, grind or weld such containers.
- In addition ensure such activity is not performed near full, partially empty or empty containers without appropriate workplace safety authorisation or permit.

RECOMMENDED STORAGE METHODS

- Lined metal can, Lined metal pail/drum
- Plastic pail
- Polyliner drum
- Packing as recommended by manufacturer.
- Check all containers are clearly labeled and free from leaks.

Glass container.

STORAGE REQUIREMENTS

- Store in original containers.
- Keep containers securely sealed.
- Store in a cool, dry, well-ventilated area.
- Store away from incompatible materials and foodstuff containers.
- Protect containers against physical damage and check regularly for leaks.
- Observe manufacturer's storing and handling recommendations.

SAFE STORAGE WITH OTHER CLASSIFIED CHEMICALS

+ + + + X +

X: Must not be stored together
O: May be stored together with specific preventions
+: May be stored together

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE CONTROLS

Source	Material	TWA ppm	TWA mg/m³	STEL ppm	STEL mg/m³	Peak ppm	Peak mg/m³	TWA F/CC	Notes
US - Oregon Permissible Exposure Limits (Z-3)	D-proline (Inert or Nuisance Dust: Total dust)		10						(d)
US OSHA Permissible Exposure Levels (PELs) - Table Z3	D-proline (Inert or Nuisance Dust: (d) Respirable fraction)		5						
US OSHA Permissible Exposure Levels (PELs) - Table Z3	D-proline (Inert or Nuisance Dust: (d) Total dust)		15						
US - Hawaii Air Contaminant Limits	D-proline (Particulates not other wise regulated - Total dust)		10						
US - Hawaii Air Contaminant Limits	D-proline (Particulates not other wise regulated - Respirable fraction)		5						
US - Oregon Permissible Exposure Limits (Z-3)	D-proline (Inert or Nuisance Dust: Respirable fraction)		5						(d)
US ACGIH Threshold Limit Values (TLV)	D-proline (Particles (Insoluble or Poorly Soluble) [NOS] Inhalable particles)		10						See Appendix B current TLV/BEI Book

US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants	D-proline (Particulates not otherwise regulated Respirable fraction)	5	
US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants	D-proline (Particulates not otherwise regulated (PNOR)(f)- Respirable fraction)	5	
US - Michigan Exposure Limits for Air Contaminants	D-proline (Particulates not otherwise regulated, Respirable dust)	5	
Canada - Prince Edward Island Occupational Exposure Limits	D-proline (Particles (Insoluble or Poorly Soluble) [NOS] Inhalable particles)	10	See Appendix B current TLV/BEI Book

MATERIAL DATA

D-PROLINE:

■ It is the goal of the ACGIH (and other Agencies) to recommend TLVs (or their equivalent) for all substances for which there is evidence of health effects at airborne concentrations encountered in the workplace.
At this time no TLV has been established, even though this material may produce adverse health effects (as evidenced in animal experiments or clinical experience). Airborne concentrations must be maintained as low as is practically possible and occupational exposure must be kept to a minimum.
NOTE: The ACGIH occupational exposure standard for Particles Not Otherwise Specified (P.N.O.S) does NOT apply.

PERSONAL PROTECTION

Consult your EHS staff for recommendations

EYE

■

- Safety glasses with side shields
- Chemical goggles.
- Contact lenses pose a special hazard; soft lenses may absorb irritants and all lenses concentrate them.

HANDS/FEET

■ Suitability and durability of glove type is dependent on usage. Important factors in the selection of gloves include: such as:

- frequency and duration of contact,
- chemical resistance of glove material,
- glove thickness and
- dexterity

Select gloves tested to a relevant standard (e.g. Europe EN 374, US F739).

- When prolonged or frequently repeated contact may occur, a glove with a protection class of 5 or higher (breakthrough time greater than 240 minutes according to EN 374) is recommended.
- When only brief contact is expected, a glove with a protection class of 3 or higher (breakthrough time greater than 60 minutes according to EN 374) is recommended.
- Contaminated gloves should be replaced.

Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturiser is recommended.
Experience indicates that the following polymers are suitable as glove materials for protection against undissolved, dry solids, where abrasive particles are not present.

- polychloroprene
- nitrile rubber
- butyl rubber
- fluorocaoutchouc
- polyvinyl chloride

Gloves should be examined for wear and/ or degradation constantly.

OTHER

■ No special equipment needed when handling small quantities.
OTHERWISE:

- Overalls.

- Barrier cream.
- Eyewash unit.

RESPIRATOR

■

- Respirators may be necessary when engineering and administrative controls do not adequately prevent exposures.
- The decision to use respiratory protection should be based on professional judgment that takes into account toxicity information, exposure measurement data, and frequency and likelihood of the worker's exposure - ensure users are not subject to high thermal loads which may result in heat stress or distress due to personal protective equipment (powered, positive flow, full face apparatus may be an option).
- Published occupational exposure limits, where they exist, will assist in determining the adequacy of the selected respiratory . These may be government mandated or vendor recommended.
- Certified respirators will be useful for protecting workers from inhalation of particulates when properly selected and fit tested as part of a complete respiratory protection program.
- Use approved positive flow mask if significant quantities of dust becomes airborne.
- Try to avoid creating dust conditions.

RESPIRATOR

■

Protection Factor	Half-Face Respirator	Full-Face Respirator	Powered Air Respirator
10 x PEL	P1	-	PAPR-P1
	Air-line*	-	-
50 x PEL	Air-line**	P2	PAPR-P2
100 x PEL	-	P3	-
		Air-line*	-
100+ x PEL	-	Air-line**	PAPR-P3

* - Negative pressure demand ** - Continuous flow
Explanation of Respirator Codes:
Class 1 low to medium absorption capacity filters.
Class 2 medium absorption capacity filters.
Class 3 high absorption capacity filters.
PAPR Powered Air Purifying Respirator (positive pressure) cartridge.
Type A for use against certain organic gases and vapors.
Type AX for use against low boiling point organic compounds (less than 65°C).
Type B for use against certain inorganic gases and other acid gases and vapors.
Type E for use against sulfur dioxide and other acid gases and vapors.
Type K for use against ammonia and organic ammonia derivatives
Class P1 intended for use against mechanically generated particulates of sizes most commonly encountered in industry, e.g. asbestos, silica.
Class P2 intended for use against both mechanically and thermally generated particulates, e.g. metal fume.
Class P3 intended for use against all particulates containing highly toxic materials, e.g. beryllium.
The local concentration of material, quantity and conditions of use determine the type of personal protective equipment required.
Use appropriate NIOSH-certified respirator based on informed professional judgement. In conditions where no reasonable estimate of exposure can be made, assume the exposure is in a concentration IDLH and use NIOSH-certified full face pressure demand SCBA with a minimum service life of 30 minutes, or a combination full facepiece pressure demand SAR with auxiliary self-contained air supply. Respirators provided only for escape from IDLH atmospheres shall be NIOSH-certified for escape from the atmosphere in which they will be used.

ENGINEERING CONTROLS

■

- Local exhaust ventilation is required where solids are handled as powders or crystals; even when particulates are relatively large, a certain proportion will be powdered by mutual friction.
- If in spite of local exhaust an adverse concentration of the substance in air could occur, respiratory protection should be considered.

Such protection might consist of:
(a): particle dust respirators, if necessary, combined with an absorption cartridge;
(b): filter respirators with absorption cartridge or canister of the right type;
(c): fresh-air hoods or masks
Air contaminants generated in the workplace possess varying "escape" velocities which, in turn, determine the "capture velocities" of fresh circulating air required to effectively remove the contaminant.

Type of Contaminant:	Air Speed:
direct spray, spray painting in shallow booths, drum filling, conveyer loading, crusher dusts, gas discharge (active generation into zone of rapid air motion)	1-2.5 m/s (200-500 f/min.)
grinding, abrasive blasting, tumbling, high speed wheel generated dusts (released at high initial velocity into zone of very high rapid air motion).	2.5-10 m/s (500-2000 f/min.)

Within each range the appropriate value depends on:

Lower end of the range	Upper end of the range

1: Room air currents minimal or favorable to capture	1: Disturbing room air currents
2: Contaminants of low toxicity or of nuisance value only.	2: Contaminants of high toxicity
3: Intermittent, low production.	3: High production, heavy use
4: Large hood or large air mass in motion	4: Small hood-local control only

Simple theory shows that air velocity falls rapidly with distance away from the opening of a simple extraction pipe. Velocity generally decreases with the square of distance from the extraction point (in simple cases). Therefore the air speed at the extraction point should be adjusted, accordingly, after reference to distance from the contaminating source. The air velocity at the extraction fan, for example, should be a minimum of 4-10 m/s (800-2000 f/min) for extraction of crusher dusts generated 2 meters distant from the extraction point. Other mechanical considerations, producing performance deficits within the extraction apparatus, make it essential that theoretical air velocities are multiplied by factors of 10 or more when extraction systems are installed or used.

Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL PROPERTIES

Solid.
Mixes with water.

State	Divided solid	Molecular Weight	115.15
Melting Range (°F)	433.4	Viscosity	Not Applicable
Boiling Range (°F)	Not applicable.	Solubility in water (g/L)	Miscible
Flash Point (°F)	Not applicable	pH (1% solution)	Not available.
Decomposition Temp (°F)	433.4 (decomp)	pH (as supplied)	Not applicable
Autoignition Temp (°F)	Not available.	Vapour Pressure (mmHG)	Negligible
Upper Explosive Limit (%)	Not available.	Specific Gravity (water=1)	Not available.
Lower Explosive Limit (%)	Not available.	Relative Vapor Density (air=1)	Not applicable
Volatile Component (%vol)	Negligible	Evaporation Rate	Not applicable

APPEARANCE

Colourless crystalline powder; soluble in water. Insoluble in alcohol. The naturally occurring form is l-(+)-proline.

Section 10 - CHEMICAL STABILITY

CONDITIONS CONTRIBUTING TO INSTABILITY

■ Product is considered stable and hazardous polymerization will not occur.

STORAGE INCOMPATIBILITY

■ Avoid contamination of water, foodstuffs, feed or seed.
Avoid reaction with oxidizing agents.

For incompatible materials - refer to Section 7 - Handling and Storage.

Section 11 - TOXICOLOGICAL INFORMATION

D-PROLINE

TOXICITY AND IRRITATION

■ No significant acute toxicological data identified in literature search.

Section 12 - ECOLOGICAL INFORMATION

Refer to data for ingredients, which follows:
D-PROLINE:

Ecotoxicity

Ingredient	Persistence: Water/Soil	Persistence: Air	Bioaccumulation	Mobility
D-proline	LOW		LOW	HIGH

Section 13 - DISPOSAL CONSIDERATIONS

Disposal Instructions

All waste must be handled in accordance with local, state and federal regulations.

¦ Legislation addressing waste disposal requirements may differ by country, state and/ or territory. Each user must refer to laws operating in their area. In some areas, certain wastes must be tracked.

A Hierarchy of Controls seems to be common - the user should investigate:

- Reduction
- Reuse
- Recycling
- Disposal (if all else fails)

This material may be recycled if unused, or if it has not been contaminated so as to make it unsuitable for its intended use. Shelf life considerations should also be applied in making decisions of this type. Note that properties of a material may change in use, and recycling or reuse may not always be appropriate.

DO NOT allow wash water from cleaning equipment to enter drains. Collect all wash water for treatment before disposal.

- Recycle wherever possible.
- Consult manufacturer for recycling options or consult Waste Management Authority for disposal if no suitable treatment or disposal facility can be identified.
- Dispose of by: Burial in a licensed land-fill or Incineration in a licensed apparatus (after admixture with suitable combustible material)
- Decontaminate empty containers. Observe all label safeguards until containers are cleaned and destroyed.

Section 14 - TRANSPORTATION INFORMATION

NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS: DOT, IATA, IMDG

Section 15 - REGULATORY INFORMATION

REGULATIONS

D-proline (CAS: 344-25-2) is found on the following regulatory lists;

"Canada Non-Domestic Substances List (NDSL)","Canada Toxicological Index Service - Workplace Hazardous Materials Information System - WHMIS (English)","Canada Toxicological Index Service - Workplace Hazardous Materials Information System - WHMIS (French)","US Toxic Substances Control Act (TSCA) - Inventory"

Section 16 - OTHER INFORMATION

Reasonable care has been taken in the preparation of this information, but the author makes no warranty of merchantability or any other warranty, expressed or implied, with respect to this information. The author makes no representations and assumes no liability for any direct, incidental or consequential damages resulting from its use. For additional technical information please call our toxicology department on +800 CHEMCALL.

■ Classification of the mixture and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.

A list of reference resources used to assist the committee may be found at:

www.chemwatch.net/references.

■ The (M)SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios. Scale of use, frequency of use and current or available engineering controls must be considered.

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Issue Date: Nov-19-2009

Print Date:Sep-8-2010

Scigrip Plastic Pipe Cement

GHS SAFETY DATA SHEET

SCIGRIP® 16 Solvent Cement for Bonding Acrylics

Date Revised: **JUN 2012**
Supersedes: **MAY 2012**

SECTION I - PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: **SCIGRIP® 16 Solvent Cement for Acrylic**
PRODUCT USE: Solvent Cement for Bonding Acrylics
SUPPLIER:
MANUFACTURER: **SCIGRIP Smarter Adhesive Solutions**
600 Ellis Road, Durham,NC 27703 - USA
P.O. Box 12729, Research Triangle Park, NC 27709 - USA
Tel. 1-919-598-2400

EMERGENCY: Transportation: CHEMTEL Tel. 800.255-3924, 813-248-0585 (International)
Medical: Tel. 800.451.8346, 760.602.8703 3E Company (International)

SECTION 2 - HAZARDS IDENTIFICATION

GHS CLASSIFICATION:

Health		Environmental		Physical	
Acute Toxicity:	Category 4	Acute Toxicity:	None Known	Flammable Liquid	Category 2
Skin Irritation:	Category 3	Chronic Toxicity:	None Known		
Skin Sensitization:	NO				
Eye:	Category 2				

GHS LABEL: OR

Signal Word: **Warning**

WHMIS CLASSIFICATION: CLASS B, DIVISION 2
CLASS D, DIVISION 1B

Hazard Statements		Precautionary Statements
H225: Highly flammable liquid and vapour		P210: Keep away from heat/sparks/open flames/hot surfaces – No smoking
H319: Causes serious eye irritation	H336: May cause drowsiness or dizziness	P261: Avoid breathing dust/fume/gas/mist/vapors/spray
H315: Causes skin irritation	H351: Suspected of causing cancer	P280: Wear protective gloves/protective clothing/eye protection/face protection
H317: May cause an allergic skin reaction		P337+P313: Get medical advice/attention
H335: May cause respiratory irritation		P403+P233: Store in a well ventilated place. Keep container tightly closed
EUH066: Repeated exposure may cause skin dryness or cracking		P501: Dispose of contents/container in accordance with local regulation

SECTION 3 - COMPOSITION/INFORMATION ON INGREDIENTS

	CAS#	EINECS #	REACH Pre-registration Number	CONCENTRATION % by Weight
Methylene Chloride*# (Dichloromethane)	75-09-2	200-838-9	17-2119926076-39-0000	30 - 60
Methyl Acetate	79-20-9	201-185-2	17-2119926085-40-0000	10 - 15
Methyl Ethyl Ketone (MEK)	78-93-3	201-159-0	05-2116297728-24-0000	10 - 30
Methyl Methacrylate Monomer*, Stabilized (MMA)	80-62-6	201-297-1	05-2116297731-37-0000	0 - 2

All of the constituents of this adhesive product are listed on the TSCA inventory of chemical substances maintained by the US EPA, or are exempt from that listing.
* Indicates this chemical is subject to the reporting requirements of Section 313 of the Emergency Planning and Community Right-to-Know Act of 1986 (40CFR372).
# indicates that this chemical is found on Proposition 65's List of chemicals known to the State of California to cause cancer or reproductive toxicity.

SECTION 4 - FIRST AID MEASURES

Contact with eyes: Flush eyes immediately with plenty of water for 15 minutes and seek medical advice immediately.
Skin contact: Wash skin with soap and water. If irritation develops, get medical attention
Inhalation: Remove to fresh air. If breathing is stopped, give artificial respiration. If breathing is difficult, give oxygen. Seek medical advice.
Ingestion: Do not induce vomiting. Seek medical advice immediately.

SECTION 5 - FIREFIGHTING MEASURES

Suitable Extinguishing Media: Water fog or fine spray, carbon dioxide, dry chemical or foam.
Unsuitable Extinguishing Media: Dry chemical powder.
Exposure Hazards: Inhalation and dermal contact.
Combustion Products: Hydrogen chloride, trace amounts of chlorine, phosgene.
Protection for Firefighters: Wear positive-pressure self-contained breathing apparatus (SCBA) and protective fire fighting clothing.

	HMIS	NFPA	
Health	2	2	0-Minimal
Flammability	3	3	1-Slight
Reactivity	1	1	2-Moderate
			3-Serious
			4-Severe

SECTION 6 - ACCIDENTAL RELEASE MEASURES

Personal precautions: Clear all personnel from area. Do not breathe vapors. Ventilate area of leak or spill. Wear protective equipment positive pressure self contained or air supplied breathing apparatus. Follow confined space entry procedures.
Environmental Precautions: Prevent product or liquids contaminated with product from entering sewers, drains, soil or open water course.
Methods for Cleaning up: Mop or soak up immediately. Place in properly labeled metal containers.
Materials not to be used for clean up: Zinc, Aluminum or plastic containers

SECTION 7 - HANDLING AND STORAGE

Handling: Avoid breathing of vapor, avoid contact with eyes, skin and clothing. Do not swallow. Use with adequate ventilation.
Do not cut, drill, grind, weld or perform similar operations on or near empty containers. Vapors of this product are heavier than air and will collect in low areas.
Do not eat, drink or smoke while handling.
Storage: Store in a dry place. Keep container tightly closed when not in use. Store below 80°F (27°C).
Follow all precautionary information on container label, product bulletins and solvent bonding literature.

SECTION 8 - PRECAUTIONS TO CONTROL EXPOSURE / PERSONAL PROTECTION

EXPOSURE LIMITS:

Component	ACGIH TLV	ACGIH STEL	OSHA PEL	OSHA STEL:
Methylene Chloride (dichloromethane)	50 ppm	N/E	25 ppm	125
Methyl Acetate	200 ppm	250 ppm	200 ppm	N/E
Methyl Ethyl Ketone (MEK)	200 ppm	300 ppm	200 ppm	300 ppm
Methyl Methacrylate Monomer, Stabilized (MMA)	50 ppm	100 ppm	100 ppm	N/E

Engineering Controls: Provide general and/or local exhaust ventilation to control airborne levels below he exposure guidelines.
Lethal concentrations may exist in areas with poor ventilation
Monitoring: Maintain breathing zone airborne concentrations below exposure limits.
Personal Protective Equipment (PPE):
Eye Protection: Use chemical goggles. If exposure causes eye discomfort, use a full-face respirator.
Skin Protection: Prevent contact with the skin as much as possible. Use protective clothing chemically resistant to this material. Remove contaminated clothing immediately, wash skin area with soap and water and launder clothing before reuse or dispose of properly.
Respiratory Protection: Prevent inhalation of the solvents. Use in a well-ventilated room. Open doors and/or windows to ensure airflow and air changes. Use local exhaust ventilation to remove airborne contaminants from employee breathing zone and to keep contaminants below levels listed above.
With normal use, the Exposure Limit Value will not usually be reached. When limits approached, use respiratory protection equipment.

GHS SAFETY DATA SHEET

SCIGRIP® 16 Solvent Cement for Bonding Acrylics

Date Revised: **JUN 2012**
Supersedes: **MAY 2012**

SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	Clear, medium syrupy liquid		
Odor:	Ketone	**Odor Threshold:**	5.4 ppm (MEK)
pH:	Not Applicable		
Melting/Freezing Point:	-99C (-146°F) (Methyl Acetate)		
Boiling Point:	39.8°C (104°F) Based on first boiling component: Methylene Chloride	**Evaporation Rate:**	> 1.0 (BUAC = 1)
Flash Point:	-10°C (14°F) (Methyl Acetate	**Flammability:**	None
Specific Gravity:	1.08 @23°C (73.4°F)	**Flammability Limits:**	**LEL:** 1.4% (MEK)
Solubility:	32g/100g H2O (Methyl Acetate)		**UEL:** 22% (Methylene Chloride)
Partition Coefficient n-octanol/water:	Not Available	**Vapor Pressure:**	355 mmHG @ 20C (Methylene Chloride)
Auto-ignition Temperature:	454°C (849°F) (Methyl Acetate)	**Vapor Density:**	>2.0 (Air = 1)
Decomposition Temperature:	Not Applicable		
VOC Content:	When applied as directed, per SCAQMD Rule 1168, Test Method 316A,VOC content is: ≤250 g/L		

SECTION 10 - STABILITY AND REACTIVITY

Stability:	Stable under recommended storage conditions. (See Section 7)
Hazardous decomposition products:	Depending on temperature and air supply, may include hydrogen chloride, trace amounts of chlorine, phosgene.
Conditions to avoid:	Avoid open flames, welding arcs, or other high temperature sources. Avoid direct sunlight.
Incompatible Materials:	Oxidizers, strong bases, amines, metals such as zinc powders, aluminum or magnesium powders, potassium sodium.

SECTION 11 - TOXICOLOGICAL INFORMATION

Likely Routes of Exposure: Inhalation, Eye and Skin Contact

Acute symptoms and effects:

Inhalation:	Excessive overexposure may cause irritation to nose and throat. In confined areas, vapor can accumulate and can cause unconsciousness.
Eye Contact:	May cause moderate eye irritation which may be slow to heal. May cause slight corneal injury. Vapor may cause mild discomfort and redness.
Skin Contact:	Prolonged contact may cause skin burns. May cause more severe response on covered skin (under clothing and gloves).
Ingestion:	Low toxicity if small amount swallowed, however larger amounts may cause injury. Aspiration into the lungs may occur during ingestion or vomiting.

Chronic (long-term) effects: IARC Classification 2B (Methylene Chloride)

Toxicity:	**LD_{50}**	**LC_{50}**	**Target Organs**
Methylene Chloride (dichloromethane)	Oral: 1500- 2500 mg/kg (rat) , Dermal: Not Determined	Inhalation 7 hrs. >10000 PPM (rat)	STOT SE3
Methyl Acetate	Oral: > 5000 mg/kg (oral/rabbit)	Inhalation 4 hrs. 12000 PPM (rat)	STOT SE3
Methyl Ethyl Ketone (MEK)	Oral: 2737 mg/kg (rat), Dermal: 6480 mg/kg (rabbit)	Inhalation 8 hrs. 23,500 mg/m^3 (rat)	STOT SE3
Methyl Methacrylate Monomer, Stabilized (MMA)	Oral: 7900 mg/kg (rat), Dermal: >35000 mg/kg (rabbit)	Inhalation: 3 hrs. 7093 PPM (rat)	STOT SE3

Reproductive Effects	Teratogenicity	Mutagenicity	Embryotoxicity	Sensitization to Product	Synergistic Products
Not Established	Not Established	Not Established	Not Established	Not Established	Not Established

SECTION 12 - ECOLOGICAL INFORMATION

Ecotoxicity:	None Known
Mobility:	In normal use, emission of volatile organic compounds (VOC's) to the air takes place, typically at a rate of ≤250 g/l. Mobility in soil is high.
Degradability:	Moderately biodegradable
Bioaccumulation:	Low

SECTION 13 - WASTE DISPOSAL CONSIDERATIONS

Follow local and national regulations. Consult disposal expert.

SECTION 14 - TRANSPORT INFORMATION

Proper Shipping Name:	Flammable Liquid, toxic n.o.s. (Methyl Acetate, Dichloromethane)
Hazard Class:	3
Secondary Risk:	6.1
Identification Number:	UN 1992
Packing Group:	PG II
Label Required:	Flammable Liquid & TOXIC - 6
Marine Pollutant:	NO

EXCEPTION for Ground Shipping

DOT Limited Quantity: Up to 1L per inner packaging, 30 kg gross weight per package.
Consumer Commodity: Depending on packaging, these quantities may qualify under DOT as "ORM-D" .

TDG INFORMATION

TDG CLASS: FLAMMABLE LIQUID 3, TOXIC 6.1
SHIPPING NAME: Flammable Liquid, toxic n.o.s. (Methyl Acetate, Dichloromethane)
UN NUMBER/PACKING GROUP: UN 1992, PG II

SECTION 15 - REGULATORY INFORMATION

Precautionary Label Information: Flammable, Harmful, Suspected Carcinogen
Symbols: F, Xn
Ingredient Listings: USA TSCA, Europe EINECS, Canada DSL, Australia, AICS, Korea ECL/TCCL, Japan MITI (ENCS), **CA Prop 65**

Risk Phrases:
R11: Highly flammable.
R36: Irritating to eyes.
R37/38: Irritating to respiratory system and skin.
R40: Limited evidence of a carcinogenic effect
R43: May cause sensitization by skin contact.
R66: Repeated exposure may cause skin dryness or cracking
R67: Vapors may cause drowsiness and dizziness

Safety Phrases:
S2: Keep out of the reach of children.
S9: Keep container in a well-ventilated place.
S16: Keep away from sources of ignition. No smoking.
S23/24/25: Avoid breathing vapors, contact with skin and eyes.
S26: In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
S29: Do not empty into drains.
S33: Take precautionary measures against static discharges.
S36/37: Wear suitable protective clothing and gloves.
S46: If swallowed, seek medical advise immediately and show this container or label.

SECTION 16 - OTHER INFORMATION

Specification Information:		
Department issuing data sheet:	IPS, Safety Health & Environmental Affairs	All ingredients are compliant with the requirements of the European Directive on RoHS (Restriction of Hazardous Substances).
E-mail address:	<EHSinfo@ipscorp.com>	
Training necessary:	Yes, training in practices and procedures contained in product literature.	
Reissue date / reason for reissue:	06/06/2012 / Updated GHS Standard Format	
Intended Use of Product:	Solvent Cement for Bonding Acrylics	

This product is intended for use by skilled individuals at their own risk. The information contained herein is based on data considered accurate based on current state of knowledge and experience. However, no warranty is expressed or implied regarding the accuracy of this data or the results to be obtained from the use thereof.

Solder

kester

Personal Protective Equipment	WHMIS Pictograms	DOT Pictograms
Safety Glasses, Protective Gloves	D2A Toxic	Not Regulated

SECTION 1 - PRODUCT AND COMPANY IDENTIFICATION

Product Name:	**Lead Solder Alloy**
Product Code:	Lead Solder Alloy
MSDS Manufacturer Number:	Lead Solder Alloy
Product Use/Restriction:	Solder
Manufacturer Name:	Kester
Address:	800 W. Thorndale Avenue Itasca, IL 60143
General Phone Number:	(630)-616-4000
Customer Service Phone Number:	(800)-2KESTER (253-7837)
CHEMTREC:	CHEMTREC 24-Hour Emergency Telephone Number: (800)424-9300 CHEMTREC 24-Hour Emergency Telephone Number: ((Outside of the U.S. and Canada):): (703)527-3887
Website:	msds@kesteccom
MSDS Creation Date:	August 15, 2008
MSDS Revision Date:	March 11, 2010

NFPA

HMIS

Health Hazard	2*
Fire Hazard	0
Reactivity	0
Personal Protection	X

* Chronic Health Effects

SECTION 2 - COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name	CAS#	Ingredient Percent	EC Num.
Antimony	7440-36-0	0 - 10 by weight	
Bismuth	7440-69-9	0 - 10 by weight	
Zinc	7440-66-6	0 - 10 by weight	
Copper	7440-50-8	0 - 10 by weight	
Lead	7439-92-1	0 - 100 by weight	
Tin	7440-31-5	0 - 100 by weight	
Silver	7440-22-4	0 - 10 by weight	

SECTION 3 - HAZARDS IDENTIFICATION

Emergency Overview:	CAUTION! Irritant. Exposures to soldering fumes and vapors may be irritating to eyes, respiratory system, and skin.
Route of Exposure:	Eyes. Skin. Inhalation. Ingestion.
Eye:	Smoke during soldering can cause eye irritation.
Skin:	May cause irritation.
Inhalation:	Prolonged or excessive inhalation may cause respiratory tract irritation.
Ingestion:	May be harmful if swallowed. May cause vomiting.
Chronic Health Effects:	Suspected of damaging fertility or the unborn child Repeated and prolonged exposure to lead and lead compounds may cause abdominal pain, diarrhea, loss of appetite, metallic taste, nausea, vomiting, lassitude, insomnia, muscle weakness, joint and muscle pain, irritability, headache and dizziness. Red blood cells may be damaged resulting in anemia. Gastritis and injury to the kidneys, liver, male gonads, and central nervous system may also occur.
Lead :	
Carcinogenicity:	IARC: Group 2B: Possibly carcinogenic to humans.

SECTION 4 - FIRST AID MEASURES

Eye Contact:	Immediately flush eyes with plenty of water for 15 to 20 minutes. Get medical attention, if irritation or symptoms of overexposure persists.
Skin Contact:	Immediately wash skin with soap and plenty of water. Get medical attention if irritation develops or persists.
Inhalation:	If inhaled, remove to fresh air. If not breathing, give artificial respiration or give oxygen by trained personnel. Seek immediate medical attention.
Ingestion:	If swallowed, do NOT induce vomiting. Call a physician or poison control center immediately. Never give anything by mouth to an unconscious person.

SECTION 5 - FIRE FIGHTING MEASURES

Flash Point:	> 93 °C (> 199 °F)
Lower Flammable/Explosive Limit:	Not applicable.
Upper Flammable/Explosive Limit:	Not applicable.
Extinguishing Media:	Use alcohol resistant foam, carbon dioxide, dry chemical, or water fog or spray when fighting fires involving this material.
Unsuitable Media:	Do not use a solid water stream as it may scatter and spread fire.
Protective Equipment:	As in any fire, wear Self-Contained Breathing Apparatus (SCBA), MSHA/NIOSH (approved or equivalent) and full protective gear.
Hazardous Combustion Byproducts:	Oxides of carbon, oxides of nitrogen, aliphatic aldehydes, and other organic substances may be formed during combustion.. Melted solder above 1000 deg F will liberate toxic lead and/or antimony fumes

NFPA Ratings:

NFPA Health:	2
NFPA Flammability:	0
NFPA Reactivity:	0
NFPA Other:	

SECTION 6 - ACCIDENTAL RELEASE MEASURES

Personnel Precautions:	Evacuate area and keep unnecessary and unprotected personnel from entering the spill area. Avoid inhaling vapors, mists, or fumes. Avoid contact with skin, eyes and clothing.
Environmental Precautions:	Avoid runoff into storm sewers, ditches, and waterways.
Methods for containment:	Melted solder will solidify on cooling and can be scraped up.
Methods for cleanup:	Solidified solder can be scraped up upon cooling. Use caution to avoid breathing fumes if a gas torch is used to cut up large pieces.

SECTION 7 - HANDLING and STORAGE

Handling:	Use with adequate ventilation. Avoid breathing vapor and fumes. Use only in accordance with directions.
Storage:	No special storage conditions required.
Hygiene Practices:	Wash thoroughly after handling. Avoid inhaling vapors, mists, or fumes.

SECTION 8 - EXPOSURE CONTROLS, PERSONAL PROTECTION - EXPOSURE GUIDELINES

Engineering Controls:	Use appropriate engineering control such as process enclosures, local exhaust ventilation, or other engineering controls to control airborne levels below recommended exposure limits. Where such systems are not effective wear suitable personal protective equipment, which performs satisfactorily and meets OSHA or other recognized standards. Consult with local procedures for selection, training, inspection and maintenance of the personal protective equipment.
Eye/Face Protection:	Safety glasses with side-shields.
Hand Protection Description:	Wear appropriate protective gloves. Consult glove manufacturer's data for permeability data.
Respiratory Protection:	When ventilation is not sufficient to remove fumes from the breathing zone, a safety approved respirator or self- contained breathing apparatus should be worn.

EXPOSURE GUIDELINES

Antimony :	
Guideline ACGIH:	TLV-TWA: 0.5 mg/m3
Guideline OSHA:	PEL-TWA: 0.5 mg/m3
Copper :	
Guideline ACGIH:	TLV-TWA: 1 mg/m3
Guideline OSHA:	PEL-TWA: 1 mg/m3
Lead :	
Guideline ACGIH:	TLV-TWA: 0.05 mg/m3
Guideline OSHA:	PEL-TWA: 0.05 mg/m3
Tin :	

Guideline ACGIH:	TLV-TWA: 2 mg/m3
Guideline OSHA:	PEL-TWA: 2 mg/m3
Silver:	
Guideline ACGIH:	TLV-TWA: 0.1 mg/m3
Guideline OSHA:	PEL-TWA: 0.01 mg/m3

SECTION 9 - PHYSICAL and CHEMICAL PROPERTIES

Physical State Appearance:	Solid
Color:	Silver grey
Odor:	Odorless
Boiling Point:	Not determined.
Melting Point:	> 100 °C (> 212 deg F)
Density:	>7 g/cm³ (@ 20 °C (68 °F))
Flash Point:	> 93 °C (> 199 °F)

SECTION 10 - STABILITY and REACTIVITY

Chemical Stability:	Stable under normal temperatures and pressures.
Hazardous Polymerization:	Not reported.
Conditions to Avoid:	No thermal decomposition if used according to specifications.
Incompatible Materials:	Oxidizing agents. Strong acids and alkalis.
Special Decomposition Products:	When heated to soldering temperatures, the solvents are evaporated and rosin may be thermally degraded to liberate aliphatic aldehydes and acids.

SECTION 11 - TOXICOLOGICAL INFORMATION

Antimony:

Ingestion:	Oral - Rat LD50: 100 mg/kg [Details of toxic effects not reported other than lethal dose value.] (RTECS)

Bismuth:

Ingestion:	Oral - Mouse LD50: 10 gm/kg [Details of toxic effects not reported other than lethal dose value.] Oral - Rat LD50: 5 gm/kg [Details of toxic effects not reported other than lethal dose value.] (RTECS)

Zinc:

Skin:	Skin - Human Standard Draize Test. : 300 ug/3D-I - [mild](RTECS)
Inhalation:	Inhalation. - Human TCLo - Lowest published toxic concentration: 124 mg/m3/50M - [Lungs, Thorax, or Respiration - cough Lungs, Thorax, or Respiration - dyspnea Skin and Appendages - sweating] (RTECS)
Ingestion:	Oral - Bird duck LDLo: 388 mg/kg - [Autonomic Nervous System - other (direct) parasympathomimetic oral - ataxia Blood - changes in leukocyte (WBC) count] (RTECS)

Copper:

Ingestion:	Oral - Mouse LD50: 413 mg/kg [Details of toxic effects not reported other than lethal dose value.] Oral - Mouse LD50: >5000 mg/kg [Behavioral - food intake (animal) Gastrointestinal - hypermotility, diarrhea Gastrointestinal - nausea or vomiting] (RTECS)

Silver:

Ingestion:	Oral - Mouse LD50: 100 mg/kg [Details of toxic effects not reported other than lethal dose value.] (RTECS)

SECTION 12 - ECOLOGICAL INFORMATION

Ecotoxicity:	No ecotoxicity data was found for the product.
Environmental Fate:	No environmental information found for this product.

SECTION 13 - DISPOSAL CONSIDERATIONS

Waste Disposal:	Consult with the US EPA Guidelines listed in 40 CFR Part 261.3 for the classifications of hazardous waste prior to disposal. Furthermore, consult with your state and local waste requirements or guidelines, if applicable, to ensure compliance. Arrange disposal in accordance to the EPA and/or state and local guidelines.

SECTION 14 - TRANSPORT INFORMATION

DOT Shipping Name:	Not Regulated.
DOT UN Number:	Not Regulated.
IATA Shipping Name:	Not Regulated.
IATA UN Number:	Not Regulated.
IMDG UN NUmber :	Not Regulated.
IMDG Shipping Name :	Not Regulated.
RID UN Number :	Not Regulated.

RID Shipping Name :	Not Regulated.

SECTION 15 - REGULATORY INFORMATION

Canada Reg. Status:	This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by the Controlled Products Regulations.
Canada WHMIS:	Controlled - Class: D2A Very Toxic
Antimony :	
TSCA Inventory Status:	Listed
Canada DSL:	Listed
Bismuth :	
TSCA Inventory Status:	Listed
Canada DSL:	Listed
Zinc :	
TSCA Inventory Status:	Listed
Canada DSL:	Listed
Copper :	
TSCA Inventory Status:	Listed
Canada DSL:	Listed
Lead :	
TSCA Inventory Status:	Listed
Canada DSL:	Listed
Tin :	
TSCA Inventory Status:	Listed
Canada DSL:	Listed
Silver :	
TSCA Inventory Status:	Listed
Canada DSL:	Listed

WHMIS Pictograms

SECTION 16 - ADDITIONAL INFORMATION

General Use:	Solder
HMIS Health Hazard:	2*
HMIS Fire Hazard:	0
HMIS Reactivity:	0
HMIS Personal Protection:	X
MSDS Creation Date:	August 15, 2008
MSDS Revision Date:	March 11, 2010
Disclaimer:	The information contained herein is based on data considered accurate and is offered solely for information, consideration and investigation. Kester extends no warranties, makes no representations and assumes no responsibilty as to the accuracy, completeness or suitability of this data for any purchaser's use. The data on this Material Safety Data Sheet relates only to this product and does not relate to use with any other material or in any process. All chemical products should be used only by, or under the direction of, technically qualified personnel who are aware of the hazards involved and the necessity for reasonable care in handling. Hazard communication regulations require that employees must be trained on how to use a Material Safety Data Sheet as a source for hazard information.

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Unleaded Solder

Cooper Hand Tools/Cheraw Plant MSDS for Lead-Free Solder

MATERIAL SAFETY DATA SHEET

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION		
Manufacturer's Name: Bow Solder Products Co. 1 Crossman Road Sayreville, NJ 08872	**Emergency Telephone Number:** 800-535-5053 **Information Phone:** 732-316-2100 **Origination Date**: January 29, 1991 **Revision Date:** April 29, 1999	**Distributor Name:** CooperTools 3535 Glenwood Avenue Raleigh, NC 27612 Information: 919-783-2126
COMMON NAME: Lead Free Solder	**PRODUCT CAS NO.:** Mixture	

2. INGREDIENTS: COMPOSITION/INFORMATION*

INGREDIENT	% WEIGHT	PEL-OSHA	TLV-ACGIH	LD 50/LC 50 ROUTE/SPECIES
Tin CAS No.: 7440-31-5 RTECS: XP7320000	> 90	2 mg/m^3	2 mg/m^3	No Data
Copper CAS No.: 7440-50-8 RTECS: GL5325000	< 5	1 mg/m^3 (as Cu) 0.1 mg/m^3 (fume)	1 mg/m^3 (dusts and mists) 0.2 mg/m^3 (fume)	LD50: 3500 µg/kg intraperitoneal/ mouse
Silver CAS No.: 7440-22-4 RTECS: VW3500000	< 2	0.01 mg/m^3	0.1 mg/m^3	LD: > 10 gm/kg oral/mouse
Antimony CAS No.: 7440-36-0 RTECS: CC4025000	< 2	0.5 mg/m^3	0.05 mg/m^3	LD50: 7 gm/kg intraperitoneal/rat

* Product contains <0.20% lead. Releases in excess of the TLV/PEL are not anticipated under normal working conditions.

3. HAZARDS IDENTIFICATION

Revision Date: August 4, 1999

Cooper Hand Tools/Cheraw Plant MSDS for Lead-Free Solder

MATERIAL SAFETY DATA SHEET

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COMMON NAME: Lead Free Solder	**PRODUCT CAS NO.:** Mixture	

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INGREDIENT	% WEIGHT	PEL-OSHA	TLV-ACGIH	LD 50/LC 50 ROUTE/SPECIES
Tin CAS No.: 7440-31-5 RTECS: XP7320000	> 90	2 mg/m^3	2 mg/m^3	No Data
Copper CAS No.: 7440-50-8 RTECS: GL5325000	< 5	1 mg/m^3 (as Cu) 0.1 mg/m^3 (fume)	1 mg/m^3 (dusts and mists) 0.2 mg/m^3 (fume)	LD50: 3500 µg/kg intraperitoneal/ mouse
Silver CAS No.: 7440-22-4 RTECS: VW3500000	< 2	0.01 mg/m^3	0.1 mg/m^3	LD: > 10 gm/kg oral/mouse
Antimony CAS No.: 7440-36-0 RTECS: CC4025000	< 2	0.5 mg/m^3	0.05 mg/m^3	LD50: 7 gm/kg intraperitoneal/rat

* Product contains <0.20% lead. Releases in excess of the TLV/PEL are not anticipated under normal working conditions.

3. HAZARDS IDENTIFICATION

Revision Date: August 4, 1999

4. FIRST AID MEASURES

EYE CONTACT: Flush eyes with water for 15 minutes. If irritation persists, seek medical attention.

SKIN CONTACT: Remove contaminated clothing and wash affected area with soap and water. If irritation persists, seek medical attention.

INHALATION: For dusts or fumes: Remove to fresh air. If breathing is difficult administer oxygen. If breathing has stopped, give artificial respiration. Seek medical attention.

OTHER: If accidental ingestion occurs give 1 to 2 glasses of water. If ingestion is substantial or irritation persists, seek medical attention.

5. FIRE FIGHTING MEASURES

FLAMMABLE PROPERTIES		
FLASHPOINT: NOT APPLICABLE		
NFPA HAZARD CLASSIFICATION: Not Classified		
FLAMMABLE LIMITS:	LEL: Not Applicable	UEL: Not Applicable

EXTINGUISHING MEDIA: Use media appropriate for surrounding fire. Do not use water on fire where molten metal is present.

FIRE AND EXPLOSION HAZARDS: Extremely high temperatures or contact with certain acids may produce toxic tin compounds. Noncombustible solid but flammable or combustible in dust and powder form.

FIRE FIGHTING EQUIPMENT: Firefighters should wear a NIOSH/MSHA-approved self-contained breathing apparatus (SCBA) operated in positive pressure mode and full turnout gear or bunker gear.

6. ACCIDENTAL RELEASE MEASURES

Not applicable.

7. HANDLING AND STORAGE

Store in dry location away from incompatible materials.

Minimize dust accumulation. Clean dusts using method which does not scatter dust. Vacuuming is preferred. DO NOT USE compressed air to blow dust from work area.

Clean work clothing should be worn daily. Clothing which becomes dusty should be changed promptly. Wash hands thoroughly after handling and before eating, smoking, breaks, and using toilet facilities.

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8. EXPOSURE CONTROLS/PERSONAL PROTECTION

RESPIRATORY PROTECTION: Under normal conditions (ambient temperature and pressure) and use none required. Above acceptable exposure guidelines, respiratory protection in accordance with 29 CFR Part 134 should be worn.

SKIN PROTECTION: Gloves to prevent skin contact with molten metal.

EYE PROTECTION: Safety glasses or goggles as necessary to prevent contact with dusts, fumes, particles or molten metal.

ENGINEERING CONTROLS: General ventilation used in combination with local exhaust in areas where dusts and/or fumes are produced from heating and machining processes.

PERSONAL CONTROL MEASURES: Air sampling for tin and antimony: Mixed cellulose ester filter, 0.8 µm (NIOSH 7300)
Air sampling for copper: Mixed cellulose ester filter, 0.8 µm (NIOSH 7029)
Air sampling for silver: Mixed cellulose ester filter, 0.8 µm (NIOSH 2(S2))

OTHER: Emergency eyewash stations

9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE:	Solid silver-white metal (various shapes and sizes)
ODOR:	Odorless
BOILING POINT:	< 4000 °F
VAPOR PRESSURE:	Not Applicable
VAPOR DENSITY:	Not Applicable
SOLUBILITY IN WATER:	Insoluble
SPECIFIC GRAVITY:	7.1 (approximate)
MELTING POINT:	430 °F (approximate)
pH:	Not Applicable
% VOLATILE:	0
VISCOSITY:	Not Applicable
SOLIDS CONTENT:	100%

10. STABILITY AND REACTIVITY

STABILITY: Stable.

INCOMPATIBILITY: Tin is incompatible with chlorine, turpentine, acids, and alkalis. Silver is

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incompatible with acetylene, ammonia, hydrogen peroxide, bromoazide, chlorine trifluoride, ethyleneimine, oxalic acid, and tartaric acid. Antimony is incompatible with strong oxidizers, acids, halogenated acids. Copper is incompatible with oxidizers, alkalis, sodium azide, and acetylene. Product as a whole is incompatible with strong acids, sulfur and chlorine

HAZARDOUS DECOMPOSITION PRODUCTS: Can form toxic metal oxides when involved in fire situation. Reaction with strong acids may produce toxic organic or inorganic tin compounds.

HAZARDOUS POLYMERIZATION: Will not occur.

11. TOXICOLOGICAL INFORMATION

INGESTION: Tin, copper, antimony and silver have relatively low oral toxicity. Although product contains < 0.20% lead, repeated ingestion over time may cause lead poisoning (see chronic).

SKIN: Antimony spots consist of papules and pustules around sweat and sebaceous glands which resemble the chicken pox.

EYE: When the lens is directly entered or injured by a foreign body containing copper, dense cataract formation and yellow green discoloration of the lens may occur.

INHALATION: Antimony metal fume fever has been reported to occur from air concentrations below 5 mg/m^3. Argyria has not resulted from air concentrations of silver which are less than 0.01 mg/m^3.

CHRONIC: Repeated inhalation of antimony and tin can cause benign pneumoconiosis. Due to antimony's association with lead and arsenic in industry and silica in mining, it is difficult to adequately assess toxicity. Many cases of illness formerly attributed to copper are now believed to have been due to an admixture of other metals especially lead. Development of argyria through inhalation appears to be very slow and may require years.

Repeated exposure to lead over time can adversely affect the central nervous system (CNS), gastrointestinal (GI) tract, kidneys, reproductive system, and blood. Lead can adversely affect fetal development. Signs and symptoms of chronic lead poisoning are various and may include metallic taste, headache, weakness, insomnia, anorexia, constipation, abdominal pain, and anemia.

OTHER: High concentrations of tin (395 gm/kg and 840 gm/kg) produced tumors when implanted in experimental animals (rat and mouse respectively). Intrapleural administration of 100 mg/kg copper has caused focal fibrosis and tumors in rats. High doses of silver (> 2.5 gm/kg) have caused tumors in animal implantation studies. Rat inhalation of 50 mg/m^3/7H/52W-I antimony produced tumors of the thorax.

12. ECOLOGICAL INFORMATION

No Data

13. DISPOSAL CONSIDERATIONS

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Dispose of in accordance with applicable local, state and federal regulations. Dispose per 40 CFR Part 261 and 262.

14. TRANSPORT INFORMATION

DOT: Not classified

15. REGULATORY INFORMATION

CANADIAN WHMIS: D2B

OSHA HAZARD COMMUNICATION RULE, 29 CFR 1910.1200: Product is considered hazardous under the criteria of this rule.

CERCLA, 40 CFR Part 302(CERCLA): This product contains copper, antimony, and silver, CERCLA Reportable Quantity (RQ) Substances, and if 5,000 or more pounds of copper or antimony or 1,000 or more pounds of silver are released, notification to the National Response Center in Wash., D.C. (1-800-424-8802) is required.

SARA 313 INFORMATION:
This product contains copper (<5%), silver(<2%), and antimony(<2%) substances which are subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372.

SARA HAZARD CATEGORY: This product has been reviewed according to the EPA Hazard Categories promulgated under Sections 311 and 312 of the Superfund Amendment and Reauthorization Act of 1986 (SARA Title III) and is considered, under applicable definitions, to meet the following categories: Acute Health Hazard
Chronic Health Hazard

CALIFORNIA PROPOSITION 65: This product contains lead (<0.20%), an ingredient known to the State of California to cause cancer and reproductive toxicity.

16. OTHER INFORMATION

KEY:

ACGIH:	American Conference of Governmental Industrial Hygienists
IARC:	International Agency for Research on Cancer
MSHA:	Mine Safety and Health Administration
NIOSH:	National Institute of Occupational Safety and Health
NTP:	National Toxicology Program

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OSHA:	Occupational Safety and Health Administration
PEL:	Permissible Exposure Limits
PNOC:	Particulate Not Otherwise Classified
PNOR:	Particulate Not Otherwise Regulated
TLV:	Threshold Limit Values

DISCLAIMER

The information in this MATERIAL SAFETY DATA SHEET should be provided to all who will use, handle, store, transport, or otherwise be exposed to this material. This information has been prepared for the guidance of plant engineering, operations and management, and for persons working with or handling this material. Bow Electronics Solders believes this information to be reliable and up-to-date as of the date of publication, but makes no warranty that it is.

Revision Date: August 4, 1999

Wood Glue

MSDS *Material Safety Data Sheet*
Wilsonart LLC

MSDS Number: 19023
Page 1 of 4

Wilsonart® PVA Wood Glue Series

Revision Date: 12/01/12
Revision No: 5

1 PRODUCT AND COMPANY IDENTIFICATION

Common Name: **Wilsonart® PVA Wood Glue Series**
Includes: **Wilsonart® 10 Adhesive**
Wilsonart® 20 Adhesive
Wilsonart® Type II Adhesive
Lokweld® White Glue (10)
Lokweld® Type II Glue

Manufacturer: **WILSONART LLC**
P. O. BOX 6110 – 2400 WILSON PLACE
TEMPLE, TX 76503
INFORMATION PHONE: 800-433-3222 (USA)

Trade Name: **WA PVA Wood Glue**

Material Uses: **Adhesive for laminate**

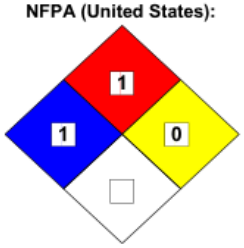
In Case of Emergency Contact CHEMTREC: **800-424-9300 (USA)**
703-527-3887 (INTERNATIONAL)

2 HAZARDS IDENTIFICATION

Route of Entry: Skin, eyes, inhalation, ingestion.
Target Organs: None.
Skin Contact: May cause skin irritation. Preexisting skin conditions may be aggravated by exposure to this material
Eye Contact: May cause eye irritation.
Inhalation: Breathing vapors may cause irritation to the respiratory tract. Preexisting respiratory conditions may be aggravated by exposure to this material.
Ingestion: Not an expected route of entry. If ingested it may cause irritation to the gastro-intestinal tract.

HMIS (United States):	
HEALTH	1
FLAMMABILITY	1
REACTIVITY	0
PPE	B

NFPA (United States):



WHMIS (Canada): Not Classified as Hazardous

3 COMPOSITION/INFORMATION ON INGREDIENTS

Name	CAS#	% by Weight
Vinyl Acetate Polymers (Type II)	Not Applicable	40 – 70
Vinyl Acetate Polymers (10, 20)	9003-20-7	40 – 70
Water (10, 20, Type II)	7732-18-5	30 – 60
Polyvinyl Alcohol (10, 20)	25213-24-5	3 – 7
Aromatic Diester (10, 20)	NJTSRN 990011; RN7416*; RN7472*	1 – 5
Aluminum Chloride (Type II)	7446-70-0	0.5 – 1.5

*See Section 15 for Canadian HMIRC Registry Number exemptions

4 FIRST AID MEASURES

Skin Contact: Remove contaminated clothing and wash affected areas with soap and water. If irritation develops, seek medical attention.
Eye Contact: Flush eyes with water for 15 minutes. Remove contact lenses prior to water flush. Seek medical attention.
Inhalation: Remove patient to fresh air. If patient is having difficulty breathing, seek immediate medical attention. If not breathing, clear airway and start mouth-to-mouth artificial respiration (or use bag-mask respirator). Seek immediate medical attention.
Ingestion: DO NOT induce vomiting. Seek immediate medical attention. DO NOT give anything by mouth to an unconscious person.

5 FIRE FIGHTING MEASURES

Flash Point: Not Applicable.
Flash Point Method: Not Applicable.
Autoignition Temp.: Not Applicable.
Burning Rate: Material is not flammable.
Flammability Classification: Combustible Liquid Class IIIB. Dry adhesive will burn.
Firefighting Equipment: Use self-contained breathing apparatus (SCBA) with a full-face piece and pressure demand or other positive-pressure mode and protective gear appropriate for surrounding materials. In case of fire, use water, dry chemical, CO_2, or alcohol foam extinguishing media.
Hazardous Products of Combustion: Carbon Oxides (CO and CO_2), Aldehydes, Acetic Acid, Sulfur Oxides, Chlorine, Hydrogen Chloride, and various Hydrocarbons.

6 ACCIDENTAL RELEASE MEASURES

Personal Precautions: Wear appropriate PPE. Make sure area is well ventilated. Spilled adhesive may be slippery.
Environmental Precautions: Keep out of sewers and drains.
Clean-Up Methods: Dike and contain spill. Absorb spilled product with vermiculite, dry sand, or earth. Place in a suitable non-leaking container and tightly seal for disposal.

7 HANDLING AND STORAGE

Handling Precautions: Wear appropriate PPE. If used indoors, make sure to provide adequate ventilation to prevent vapor build-up. Avoid breathing of vapors.
Storage Requirements: Store in a cool, dry, well-ventilated area. Avoid freezing temperatures. Minimize contact with atmospheric air to prevent inoculation with microorganisms.

8 EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering Controls: Use in a well ventilated area. Ensure that a working eyewash and safety shower are in the work area.
Protective Equipment: Wear safety glasses with side shields, and neoprene or rubber gloves.
Exposure Guidelines / Other:

Product Name	Exposure Limits
Aluminum Chloride (CAS 7446-70-0)	ACGIH TLV: TWA 2 mg/m^3 (as soluble salt)

Consult local authorities and local regulations for exposure limits.

9 PHYSICAL AND CHEMICAL PROPERTIES

Appearance: Liquid – color varies by adhesive grade.
Physical State: Liquid
Odor: Mild sweet
Autoignition Temp.: Not Applicable

Boiling Point: Similar to water
Composite Partial Pressure: Not Applicable
Flash Point: Not Applicable
Freezing / Melting Point: Similar to water
Molecular Weight: Not Applicable
Percent Volatile: Not Available
pH: 4 – 5 (10 & 20); 2.9 – 3.1 (Type II)
Solubility: Soluble in Water
Specific Gravity / Density: 1.07 – 1.10 (10, 20); 1.07 – 1.09 (Type II)
Vapor Density: Equivalent to water
Vapor Pressure: Equivalent to water
VHAP: Not Applicable
VOC: < 20 g/L
Viscosity: ~ 5600 cP (10); ~ 4750 cP (20); ~ 4900 cP (Type II)

10 STABILITY AND REACTIVITY

Stability: Product is stable as supplied.
Conditions to Avoid: Freezing and boiling temperatures.
Materials to Avoid (Incompatibility): Strong acids, strong bases, oxidizers, reducing agents, copper and copper alloys.
Hazardous Decomposition Products: Carbon Oxides (CO and CO_2), Aldehydes, Acetic Acid, Sulfur Oxides, Chlorine, Hydrogen Chloride, and various Hydrocarbons.
Hazardous Polymerization: Will not polymerize.

11 TOXICOLOGICAL INFORMATION

Acute Toxicity to Animals:
Aluminum Chloride (CAS 7446-70-0): Oral LD50 = 370 mg/kg (rat).
Dermal LD50 > 2000 mg/kg (rabbit).
Polyvinyl Alcohol (CAS 25213-24-5): Inhalation 1 hour LC50 > 20 mg/m^3 (rat).
Oral LD50 > 5000 mg/kg (rat).
Chronic Toxicity to Animals: No additional information.
Acute Toxicity to Humans: No additional information.
Chronic Toxicity on Humans: No additional information.
Carcinogenic Effects: No additional information.
Mutagenic Effects: No additional information.
Teratogenic Effects: No additional information.
Developmental Toxicity: No additional information.

12 ECOLOGICAL INFORMATION

Ecotoxicity: Not Available. Not expected to be ecotoxic.
BOD5 and COD: Not Available.
Biodegradable / OECD: Not Available.
Mobility: Not Available.
Toxicity of the Products of Biodegradation: Not Available.
Special Remarks on the Products of Biodegradation: Not Available.

13 DISPOSAL CONSIDERATIONS

Absorb spilled product with vermiculite, dry sand, or earth and allow to solidify. Dispose of solid material in a suitable container.

Dispose of in accordance with Federal, State, and local regulations.

14 TRANSPORT INFORMATION

Restrictions: None known.
DOT Requirements: Not a DOT controlled material (United States).
DOT Classification: Adhesive Resin Compound.
Markings: None.
Packaging Requirements: Keep from freezing.
ADR Requirements: Not an ADR controlled material (Europe).
IMDG Requirements: Not an IMDG controlled material.
IATA Requirements: Not an IATA controlled material.
Marine Pollutant: Not expected to be a marine pollutant.

15 REGULATORY INFORMATION

U.S. Federal Regulations

Chemical (& CAS Number)	SARA 302 (EHS)TPQ	SARA 304 (EHS)Rq	SARA 313 *De minimis*	CERCLA Rq	CAA 112(r) TQ	RCRA Code
None						

All quantities in pounds

State Regulations

Chemical (& CAS Number)	CA Prop 65	MA RTK	MN RTK	NJ RTK	PA RTK	RI RTK
Aluminum Chloride (CAS 7446-70-0)		X		X	X	X

International Regulations

DSL (Canada): The chemicals in this product are listed.
EINECS: The chemicals in this product are listed.
WHMIS: Not classified as hazardous.
HMIRC: Registry Number 7416 and 7472, exemption granted October 15, 2010.

16 OTHER INFORMATION

Prepared by: Environmental, Health, and Safety Department, Wilsonart LLC.
Telephone: 254-207-7000 Internet: www.wilsonart.com

Notice to Reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above named manufacturer nor any of its subsidiaries assumes any liability whatsoever for accuracy or completeness of the information contained herein.
Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

END OF MSDS DOCUMENT

River City Rocketry

University of Louisville

Safety Compliance Form

By signing this form:

- I agree to comply with all safety rules and regulations set forth by the safety manual.
- I have read and am familiar with the entire document.
- I understand that it is my responsibility to remain up to date with the latest version of the safety manual.
- If I violate these regulations, I realize that I may not be able to participate in construction or launch activities.
- I will strive to follow these safety procedures and encourage safety throughout the team and at educational events.

_____ _____

Signature Date